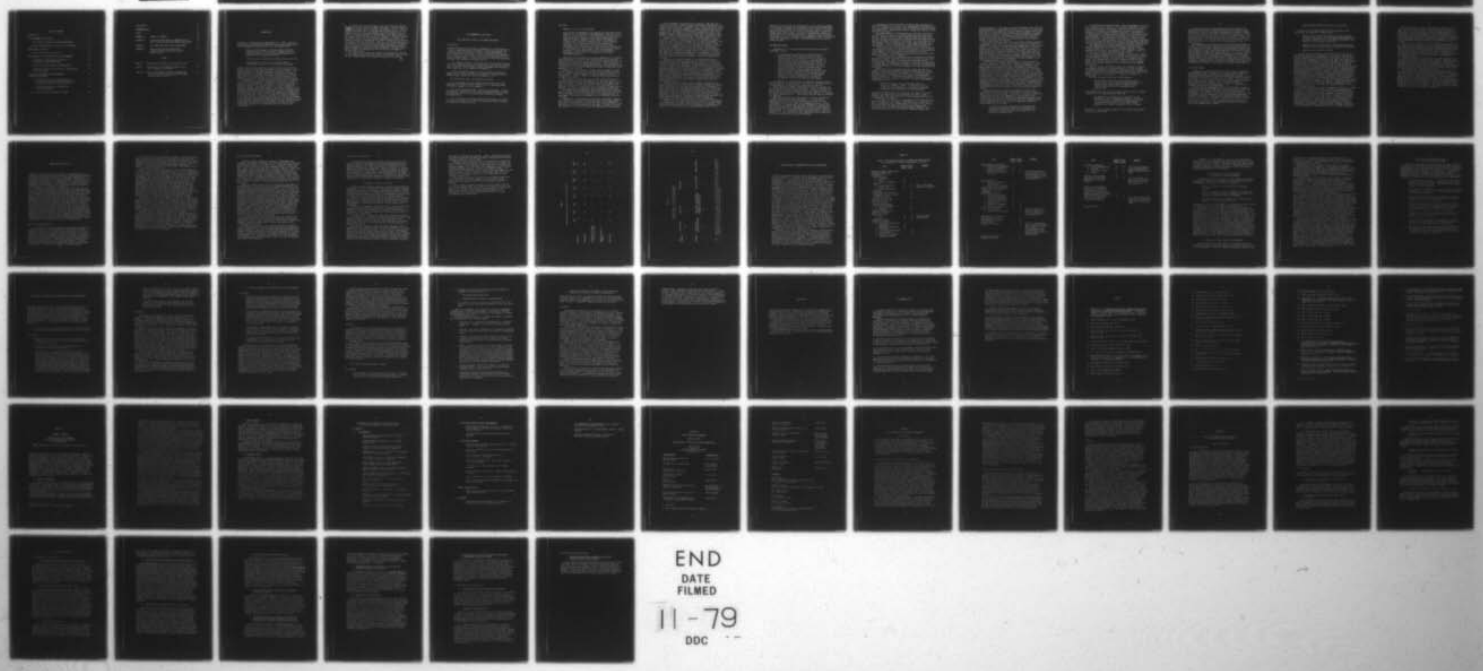
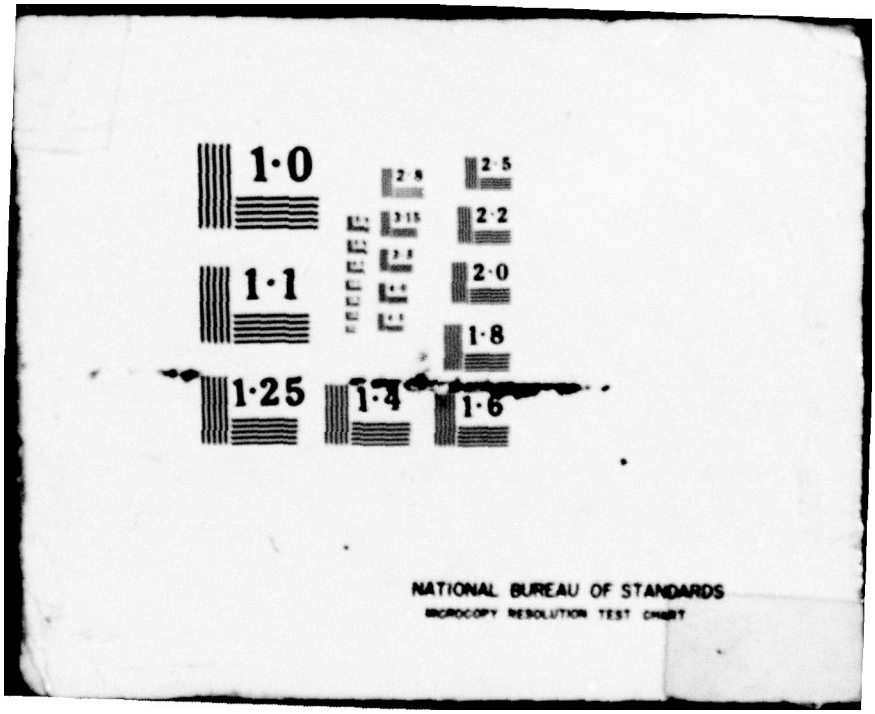
AD-A075 536 NATIONAL RESEARCH COUNCIL WASHINGTON DC PANEL ON BES--ETC F/G 21/4
IMPLEMENTING BEST AVAILABLE AND SAFEST TECHNOLOGIES FOR OFFSHOR--ETC(U)
1979 N00014-76-C-0309

UNCLASSIFIED NL

1 OF 1
AD-
A075536

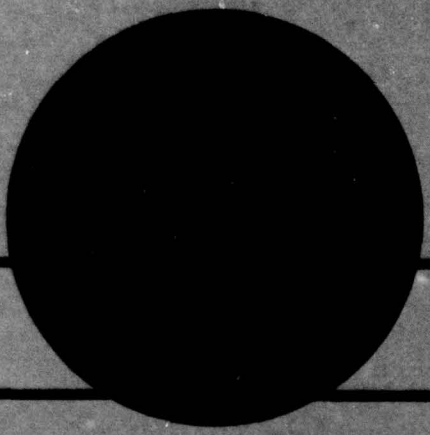


END
DATE
FILMED
11-79
DDC


1·0
1·1
1·25
1·4
1·6
2·5
2·2
2·0
1·8
NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

LEVEL II

Implementing *Best Available and Safest Technologies* for Offshore Oil and Gas



Marine Board

Assembly of Engineering

(12)

IMPLEMENTING *BEST AVAILABLE AND SAFEST TECHNOLOGIES* FOR OFFSHORE OIL AND GAS

A Report Prepared by the

Panel on Best Available and Safest Technologies

Assembly of Engineering, National Research Council

(15) N00014-76-C-0309

(12) 76

National Academy of Sciences

Washington, D.C.

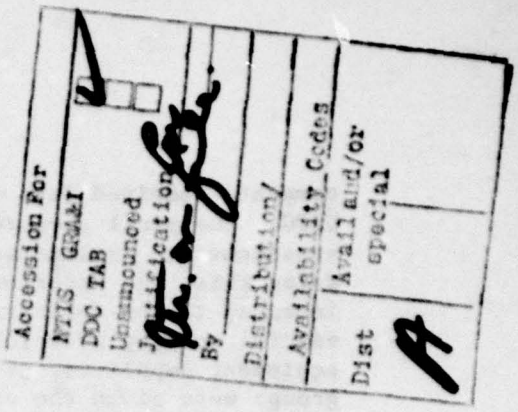
(11) 1979

NOTICE

The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

This report represents work supported by Contract Number N00014-76-C-0309 between the Office of Naval Research and the National Academy of Sciences.



PREFACE

Concern about the adequacy of government procedures relating to the safety and efficacy of oil and gas operations on the outer continental shelf (OCS) caused the Congress to enact a series of amendments in 1978 to the Outer Continental Shelf Lands Act (P.L. 95-372) (OCSLA). Subsection 21 (b), one of the provisions of the amended act, increases the responsibilities of the U.S. Geological Survey (USGS) of the Department of the Interior and the U.S. Coast Guard (USCG) of the Department of Transportation by directing them to require "on all new drilling and production operations, and wherever practicable, on existing operations, the use of the best available and safest technologies [that are considered by the agencies to be] economically feasible..."

This report deals with those technologies, which have come to be known by the foreshortened term of "BAST." The report culminates a study, undertaken at the request of the USGS, by the Panel on Best Available and Safest Technologies under the auspices of the National Research Council's Marine Board. It suggests guidelines that might be adopted by the USGS and USCG in implementing Subsection 21 (b).

The study was performed as a sequel to an earlier request from the USGS to suggest a strategy the agency could use in carrying out its major new responsibilities under the OCSLA. In that strategy, issued in December 1978, the Marine Board cautioned that "because different technologies may be necessary in different situations...there are no best available and safest technologies for universal application to all offshore oil and gas development operations."1/ Accordingly, the Marine Board observed, it is not "incumbent on either [agency], in order to establish compliance with the statute, to specify through regulation a particular technology or technologies as the 'best and safest.'"

Subsequently the USGS announced in the Federal Register (Vol. 44, No. 28) of February 8, 1979, that public comments and recommendations would be invited on the nature, scope, and content of its best available and safest technologies (BAST) program and implementing regulations.2/ Appendix A is a summary of the public responses received by the USGS.

The panel conducted its study in a manner intended to be responsive to public and industry views on the implementation of the BAST requirement. Initially the panel reviewed the legislative history of the BAST requirement, as well as the actions taken on BAST, and

comments received from the public and industry by the USGS and the USCG. The panel prepared criteria for the consideration of possible approaches to implementation and developed three approaches. In doing this, the experience and judgment of the panel members were integral to the deliberations. Afterward the panel convened a special meeting at which representatives of offshore operators and equipment suppliers, state and local governments, and environmental groups were given the opportunity to discuss the three approaches.* A list of participants and observers appears as Appendix B. In evaluating the responses of the participants, the panel recognized that no single approach could be recommended over any other, and that there were desirable elements in each approach that could be applied in the implementation of BAST. Finally, the panel formulated its conclusions and recommendations based on its analysis of approaches and the public record, as well as on its own study of the BAST requirement.

*A transcript of this meeting is available for review at the offices of the Marine Board, National Research Council.

PANEL ON BEST AVAILABLE AND SAFEST TECHNOLOGIES

LEONARD C. MEEKER, Center for Law and Social Policy, Chairman

JOHN D. COSTLOW, Jr., Duke University Marine Laboratory

FLOYD E. GARROT, Exxon U.S.A.

MYRON H. NORDQUIST, Nossaman, Krueger & Marsh

WILLARD F. SEARLE, Jr., Searle Consultants, Inc.

ERIC E. VAN LOON, The Commonwealth of Massachusetts

IRVIN L. WHITE, Environmental Protection Agency

MARINE BOARD

ASSEMBLY OF ENGINEERING

BEN C. GERWICK, JR., University of California, Berkeley
Chairman

DAYTON L. ALVERSON, National Oceanic and Atmospheric Administration

JOHN D. COSTLOW, JR., Duke University Marine Laboratory

PHILLIP EISENBERG, Hydronautics, Inc.

DAVIS L. FORD, Engineering Science Company

WILLIAM S. GAITHER, University of Delaware

RONALD L. GEER, Shell Oil Company

ROBERT C. GOODING, U.S. Navy (ret.)

JAMES L. JOHNSTON, Standard Oil Company (Indiana)

MARTHA L. KOHLER, Bechtel Corporation

GRIFF C. LEE, J. Ray McDermott and Company, Inc.

LEONARD C. MEEKER, Center for Law and Social Policy

J. ROBERT MOORE, University of Texas at Austin

MYRON H. NORDQUIST, Nossaman, Krueger & Marsh

DAVID S. POTTER, General Motors Corporation

JAMES A. RICKARD, Exxon Production Research Company

WILLARD F. SEARLE, JR., Searle Consultants, Inc.

JAMES G. WENZEL, Lockheed Missiles & Space Company, Inc.

ROBERT L. WIEGEL, University of California, Berkeley

MARINE BOARD STAFF

JACK W. BOLLER, Executive Director

JEAN P. MOORE, Staff Officer

CHARLES BOOKMAN, Consultant

SUMMARY

In 1978 the Congress called for a comprehensive reassessment of the nation's technological capabilities to assure the safety of oil and gas operations on the Outer Continental Shelf. If the technologies were found to be inadequate or inappropriate to today's conditions, they were to be changed, replaced, or eliminated.

The Congressional mandate for this assessment is laid out in amendments to the Outer Continental Shelf Lands Act (P.L. 95-372), in particular in Subsections 21 (a) and (b). Subsection 21 (a) calls for a study of safety and health regulations and OCS technology, equipment, and techniques, the results of which would be the basis for a plan to assure operational and human safety in OCS oil and gas development and production.* Subsection 21 (b) makes the U.S. Geological Survey (USGS) and the U.S. Coast Guard (USCG) responsible for requiring "on all new drilling and production operations and, wherever practicable, on existing operations, the use of the best available and safest technologies which the [agencies determine] to be economically feasible, wherever failure of equipment would have a significant effect on safety, health, or the environment..."**

At the request of the USGS, the National Research Council established a Panel on Best Available and Safest Technologies under its Marine Board in the Assembly of Engineering to recommend guidelines for the implementation of Subsection 21 (b). Because of the close relationship between 21 (a) and 21 (b), the panel began its study by consulting the Congressional Conference Report in order to determine if a priority of actions was intended by the law. The panel concluded that although it is clear that the study of OCS safety called for in 21 (a) is a vital part of the legislative mandate, there is no requirement in the law that the study precede the implementation of BAST, the acronym commonly used for "best available and safest technologies."

The panel finds, however, that certain factors need to be taken into account in implementing BAST. The OCS regulatory system is complex, and there are many overlapping authorities, especially in the regulation of safety. Also, effectuating BAST will require that the federal government develop a technological capability equal to the task. An effective procedure will be necessary to augment the nation's supply of oil and gas from the OCS, while at the same time protecting the marine environment and safeguarding life and property.

* Section 208, 21 (a); 92 Stat. 654; 43 USC 1347.
**Section 208, 21 (b); 92 Stat. 655; 43 USC 1333.

The panel identified several problems posed by Subsection 21 (b) that must be resolved prior to its implementation. For example, whether explicitly or implicitly, assuring the highest degree of safety will require that the government establish acceptable levels of risk for OCS operations. Also, particular applications of BAST must be economically feasible. Further, the law requires that BAST must be applied, unless the incremental benefits of a particular application are clearly insufficient to justify the incremental costs of the improved technology. Finally, BAST is applicable wherever equipment failures could have serious adverse effects on safety, health, and the environment.

The panel realizes that government agencies, or anyone else for that matter, cannot devise regulations or guidelines for all possible accidents and malfunctions in complex systems such as offshore oil and gas facilities. While it is an incontrovertible fact that offshore oil and gas production equipment has earned a remarkable record for safety in the past 25 years, human performance has often been attributed as a cause of failures and mishaps. The BAST requirement is limited to technologies and is not designed to mitigate human errors.

As options for implementing BAST, the panel developed three approaches. The first approach represented minor modification of present practices to assure that the best available and safest technologies are used on the OCS. The second was a procedural approach to implementing BAST, and the third approach represented a BAST standards development program.

The approaches were evaluated against a set of criteria formulated for that purpose. As a result of its evaluation, the panel concludes that no single approach could be recommended over the others. On the contrary, each approach contains necessary and important program elements for the implementation of the BAST requirement. Rather than describing unrelated approaches to the BAST program, each approach actually describes scenarios at different points on a continuum. The continuum represents the degree of government involvement in and technological capability for implementing BAST.

The panel recognizes that implementation of the BAST requirement will probably be an evolutionary process. Even so, implementation should begin promptly to enhance and maintain the excellent historical record of safety and environmental protection on the OCS, and to strengthen the public confidence that oil and gas operations on the OCS are being conducted in the best and safest manner.

Therefore, the panel concludes that the Secretaries of the Interior and of Transportation should conduct promptly and expeditiously the study called for in Subsection 21 (a) of the OCS Lands Act Amendment. Initiating the process of implementing Subsection 21 (b), however, should not be postponed pending completion of the study.

Moreover, the panel offers the following recommendations to assist the government in implementing BAST. The recommendations are listed in order of priority.

1. The USGS and USCG should take steps to assure that they have the technological capability to assess and evaluate OCS technologies and technological developments for the purpose of discharging their responsibilities under Subsection 21 (b) of the OCS Lands Act Amendments.

Adequate personnel is an important element in technological capability. The government will require additional expertise for the implementation of the BAST requirement. A rigorous personnel analysis should be conducted in support of implementation of the BAST requirement. The analysis should identify the kinds of trained skills and professional judgments that are needed to conduct the additional program management, field inspection, and technological evaluation services associated with implementation of the BAST requirement. Additional expertise can be obtained by hiring personnel directly or by retaining qualified contractors.

2. Duplication and contradiction in the regulation of OCS operations should be eliminated. The responsible government agencies should adopt an appropriate and effective mechanism of coordination and should clarify, in each instance of regulation, which agency has responsibility.

3. As the Subsection 21 (a) study progresses, the USGS and USCG should take appropriate actions, where indicated in the light of results produced by the study, to give effect to BAST in accordance with Subsection 21 (b).

4. In incorporating the BAST requirement of Subsection 21 (b) in OCS regulations, the USGS and USCG should begin immediately to introduce BAST into proposed new or revised regulations, orders, and applications for permits and approvals.

5. The USGS and USCG and the OCS lessees should give particular attention to the BAST requirement with respect to offshore sites of high potential risk and areas for which there is not a large body of operating experience, such as the North Atlantic and Arctic Oceans.

6. With respect to OCS operations in which deficiencies are known or have been suspected and opportunities for significantly improved performance have been identified, the USGS and USCG should initiate, promote, and, where necessary, invest in the development of improved technologies and in improved design review or quality assurance procedures. Government agencies should invest in technological development when there are inadequate incentives for industry to do so. This can occur when proposed technological developments are characterized by high risks or long-term payout periods, or both.

7. The USGS and USCG should prepare and follow a procedure for receiving and evaluating information from OCS lessees, operators, manufacturers, and the public about new technological developments or the need for new technologies in OCS operations.

8. The USGS and USCG should exercise leadership in developing appropriate performance standards for OCS operations by advocating or requiring procedures designed to assure careful consideration of BAST. While the agencies may be expected initially to rely on industry performance standards for OCS operations, particularly in areas of substantial operating experience, they should develop the technological capability to participate in the development and sponsorship of performance standards to complement and strengthen existing industry standards.

9. The USGS and USCG should determine the documentation on safety and environmental protection that is essential to the discharge of their statutory responsibilities. They should analyze the information obtained and develop procedures for making the information available to the public.

TABLE OF CONTENTS

TABLES

INTRODUCTION

Section 21 of the OCS Lands Act Amendments (P.L. 95-372) calls for three kinds of deliberate government actions to promote human safety and environmental protection on the outer continental shelf:

- o A study of the adequacy of existing safety and health regulations and of the technology, equipment, and techniques available for the exploration, development, and production of the minerals of the OCS;
- o A plan to promote operational and human safety on the OCS;
- o A requirement that the best available and safest technologies be used on the OCS (the BAST requirement).

Although they all will contribute to greater safety on the OCS, the study, the plan, and the BAST requirement are each intended to serve distinct purposes. This report explores the purposes of BAST. It examines BAST as a procedural requirement with which OCS operators must comply and as a possible implementation mechanism for the findings of the study and the plan. It also provides information and analysis necessary for interpreting and implementing the requirement.

The definition of the term "technology" is central to interpretation of the BAST requirement. Technology has been defined by the National Science Board as the application of scientific knowledge for practical purposes. Technology is manifest in the development of equipment, systems, and trained workers. The safest technology is the technology characterized by the lowest level of risk, of malfunction or failure and therefore offering the greatest degree of operating safety and reliability. Selection of a particular technology is dependent not only on its reduction of risk, but on reduction of risk in comparison to the costs involved. This particular point is specifically addressed in the statutory language of the BAST requirement. One exception in the law to application of the BAST requirement is in those instances "where the Secretary determines that the incremental benefits are clearly insufficient to justify the incremental costs of utilizing such technologies."3/

This definition of terms brings to the fore two issues that are raised--but not resolved--by the BAST requirement. The first issue is that the government needs to determine an acceptable level of risk for offshore operations that is consistent with national policy. For the purpose of its work, the panel assumed that the acceptable level of risk for offshore operations is zero accidents, zero deaths, and zero oil spills--though this goal may not be attainable. The panel realizes that neither the law nor any government regulation can prevent all possible accidents or malfunctions in complex systems such as offshore oil and gas production facilities. While it is an incontrovertible fact that offshore oil and gas production equipment has earned a remarkable record for safety in the past 25 years, human performance has often been attributed as a cause of failures and mishaps. The BAST requirement is limited to technologies on the OCS and is not designed to mitigate human errors.

This leads to the second issue, which is the problem of calculating incremental benefits and costs related to obtaining a desired level of risk. These problems are discussed in detail in the report.

1978 AMENDMENTS TO THE OCSLA

The Legislative Intent of the BAST Requirement

Introduction

The Outer Continental Shelf Lands Act Amendments of 1978 became law at a time of increasing scarcity of domestic oil and gas supplies, and increasing public awareness of the need to assure human safety and protect the natural environment. One basic purpose of the legislation is "to promote the swift, orderly, and efficient exploitation of our almost untapped domestic oil and gas resources in the Outer Continental Shelf."4/ Other purposes of this Act are to:

"(2) preserve, protect, and develop oil and natural gas resources in the Outer Continental Shelf in a manner which is consistent with the need...to balance orderly energy resource development with protection of the human, marine, and coastal environments...;

"(3) encourage development of new and improved technology for energy resource production which will eliminate or minimize risk of damage to human, marine and coastal environments..."5/

In setting these goals, the Congress found that:

"(6) technology is or can be made available which will allow significantly increased domestic production of oil and gas without undue harm or damage to the environment...;

"(8) there presently exists a variety of technological, economic, environmental, administrative, and legal problems which tend to retard the development of the oil and natural gas reserves of the Outer Continental Shelf;

"(9) environmental and safety regulations relating to activities on the Outer Continental Shelf should be reviewed in light of current technology and information...;"6/

The Study

Subsection 21 (a) of the law reads:

> Upon the date of enactment of this section, the Secretary [of the Interior] and the Secretary of the Department in which the Coast Guard is operating shall, in consultation with each other and, as appropriate, with the heads of other Federal departments and agencies, promptly commence a joint study of the adequacy of existing safety and health regulations and of the technology, equipment, and techniques available for the exploration, development, and production of the minerals of the outer Continental Shelf. The results of such study shall be submitted to the President who shall submit a plan to the Congress of his proposals to promote safety and health in the exploration, development, and production of the minerals of the outer Continental Shelf.7/

Regarding the participants in the study, Subsection 21 (a) directs that the Geological Survey and the Coast Guard will be the parties responsible for the study. It also provides for consultation "with the heads of other Federal departments and agencies." Early versions of the Senate bill included the Department of Labor; more specifically the Occupational Safety and Health Administration was to participate in the generation of the study.8/

Subsection 21 (a) calls for a "joint study" and refers to "such study." Does this mean that the USGS and the USCG, working together, are to produce a single document? Or does it mean that each is concurrently to produce a study of the matters within the respective jurisdiction of each?

On one hand, the adjectives used--"joint" and "such"--seem to indicate a single study by both agencies. On the other hand, it would not be necessary to require that the USGS and the USCG commence the study "in consultation with each other" if only one study was to be prepared. The use of the singular "study" could mean a single study by each or it could mean a single study by both administrative bodies.

According to the Congressional legislative staff consulted by the panel, a single study was intended, with either the USGS or the USCG to act as lead agency--the choice being left to the Administration; or each agency could divide the responsibility for different portions of the study.

Subsection 21 (a) requires that the study be "promptly" commenced upon the date of enactment of the subsection.9/ Such language suggests that the study begin as soon as the task could be assigned to the appropriate unit within the agency or department. Moreover, the wording connotes a call to action. Certainly something new was mandated.

The OCS amendments as passed did not specify a time limit for completing the study. However, Congress undoubtedly intended that the study be concluded within a reasonable time. A rough indication of the amount of time considered necessary to complete the study can be found in H.R. 1614, introduced by Representative John Murphy of New York in January 1977. His version of the OCS bill assigned the study to the National Academy of Engineering and provided that the results be submitted "not later than nine months after the date of enactment..."10/

Implicit in the call for a study, in the requirement for the President to submit to Congress a plan of his proposals to promote safety and health, and in the mandate for an orderly development of OCS resources is the idea that the study and resulting regulatory plan should precede implementation of the regulatory provisions of Subsection 21 (b). Arguably, without the study results, determination of BAST and the balancing of the relevant economic factors might be less than fully considered and might bias the outcome of the study. More importantly, premature implementation of Subsection 21 (b) would not improve the "bureaucratic nightmare" of uncoordinated government action the House OCS Committee intended to relieve by requiring the study.11/

While such concerns are evident in the legislative history, no clear mandate for sequential application of 21 (a) and 21 (b) was explicitly stated in the amendments finally enacted. It is pertinent to note that the scope of the study is much broader than just the application of BAST. The requirement for BAST is to be incorporated into existing regulations and is not necessarily to be the subject of separate substantive regulations. Indeed, BAST could be implemented by the issuance of procedural rules. If so, Subsection 21 (b) would be implemented as soon as BAST procedures and determinations were made. At the same time, the importance of the study could be recognized if, after initial BAST application, the incremental implementation was effectuated in logical and easily identifiable instances which had been sufficiently studied.

The study was intended to be used to improve the efficacy of safety regulations and to correct those problems retarding the development of OCS resources. The House Report states that information is often insufficient as to whether the responsibilities of the USGS and the USCG for safety is being adequately handled.12/ The report indicates that a review of environmental and safety regulations must be undertaken in light of current technology and information in order to resolve the technological, economic, environmental, administrative, and legal problems impeding the development of OCS resources.13/ Accordingly, the study should cover each of the itemized topics.

Subsection 21 (a) states that the study shall be "of the adequacy of existing safety and health regulations and of the technology, equipment, and techniques available for the exploration, development, and production of the minerals of the outer Continental Shelf." This

sentence structure allows two interpretations of the study's treatment of "technology, equipment, and techniques." First, the intended objective could be the "adequacy...of the technology." Second, it could be "of the technology"--i.e., the status of the technology. A third and perhaps better option exists. In order to effectuate the purpose of the Act most fully, both the status and the adequacy should be studied--the status in order to determine the full meaning of "best available and safest" and the adequacy in order to determine where further initiatives are needed.

The BAST Requirement

Subsection 21 (b), the best available and safest technologies requirement, reads:

> In exercising their respective responsibilities for the artificial islands, installations, and other devices referred to in section 4 (a) (1) of this Act, the Secretary, and the Secretary of the Department in which the Coast Guard is operating, shall require, on all new drilling and production operations and wherever practicable, on existing operations, the use of the best available and safest technologies which the Secretary determines to be economically feasible, wherever failure of equipment would have a significant effect on safety, health, or the environment, except where the Secretary determines that the incremental benefits are clearly insufficient to justify the incremental costs of utilizing such technologies.

The language in this subsection is mandatory. The words "shall require" impose a new review process that the USGS and USCG must follow in evaluating the technology used on operations on the OCS.

Best available and safest technologies or BAST are required for use on "drilling and production operations." It was not intended that the regulators formulate a technical scheme covering every aspect of OCS oil and gas exploration and exploitation.14/ BAST are not required for vessels transporting crude oil to shore, although they are required for pipelines.

BAST are required for all new operations, but are required for existing operations only where practicable. It is clear that "existing" is at the time of the introduction of better or safer technologies and not at the time of the passage of the Act. It was not the intent of Congress that installed equipment be replaced with every minor technological improvement,15/ or that oil or gas production be halted while costly BAST modifications were made to existing operations.16/ The legislative history indicates, however, that an operator of an existing operation must demonstrate why the application of a new technology would not be practicable.17/

The meaning of the words within the phrase "best available and safest technologies" are crucial to the implementation of Subsection 21 (b). Yet Congress was not always clear in providing definitions during its deliberations. Congress did, however, express its views on certain aspects of the phrase.

The Senate Report on S.9 recognized that there may be more than one "best" way to achieve a particular objective or do a particular job.18/ Testimony before the House Committee emphasized that "best" does not necessarily mean the most sophisticated or the highest priced, and that very often the simplest is the best. A strong connection was made between "best" and "most reliable" where safety equipment was concerned.19/ It may be expected that "best" means that which would most completely fulfill the composite purpose of the legislation.

There is very little in the legislative history of the Act defining the term "available," but there is some record of the inclinations of the members of the House Ad Hoc Select Committee on the OCS. Similar provisions in environmental legislation provide further clues about the probable intent of Congress.

The House Committee was impressed with the technological advances made by the industry on its own and indicated its desire to have those advances (as actually used on at least some operations) applied universally.20/ The Committee also wanted to encourage the development of new and improved technology to minimize risks to the environment.21/ The limited information on the point suggests a broad interpretation of "available."

These indications are reinforced by the intent revealed with respect to more sharply defined but similar terminology used in water pollution control legislation (See Appendix C). The Federal Water Pollution Control Act Amendments of 1977 use the term "available control technology." In discussing the meaning of "availability," the Senate Report (S.2770) refers to "available or normally <u>can be made</u> available" and states:

> This does not mean that the technology must be in actual use somewhere. Rather, it means that the technology must be available at a cost and at a time which the Administrator determines to be reasonable.22/

The foregoing comments about the term "best" also apply to the term "safest." The legislative record indicates only that it means something more than "safe," and that the exact meaning would be left to administrative discretion.

In contrast, the meaning of "technologies" (and "technology") was extensively debated. As a result, Congress gave a clear picture of what it intended the word "technologies" not to mean. Early versions of both the House and Senate bills employed the singular term "technology."23/ The House version was amended in February 1978 to read "technologies,"24/ and the Conference Committee adopted that

amended language.25/ This change was made "to emphasize that more than one technology may be applicable as the best way to achieve a particular objective or to do a particular job."26/ There was substantial concern about the anti-competitive and innovation-stifling impacts of designating a single technology, technique, or product as "best" and banning the use of any other.27/ The USCG and the USGS must not require a specific technology, therefore, to the exclusion of others equally capable of performing the function.

The statute does not require the use of "best available and safest technologies" in all cases. It is not required if not economically feasible, if failure of equipment would not significantly affect safety, health, or environment, or if the incremental benefits are clearly insufficient to justify the incremental costs. Early versions of the legislation used the words "economically achievable" rather than the words "economically feasible." The choice of language was patterned after the terminology in existing environmental laws--e.g., the Clean Water Act's "best available technology economically achievable." The House bill was amended (without discussion) to read "feasible," and this change was adopted in conference.28/

The "failure of equipment significantly affecting" provision raises two questions. First, does it include consideration of equipment failures caused by improper use? Testimony by members of the National Advisory Committee on Oceans and Atmosphere stressed that perhaps most OCS accidents are caused by human error.29/ Are BAST to be applied to compensate for human mistakes? Second, what is a "*significant effect* on safety, health, or the environment? Does one mean a broken arm, a blowout, a hundred-barrel oil spill? For guidance, the policy section of the Act speaks of preventing or minimizing the likelihood "of blowouts, loss of well control, fires, spillages,...or other occurrences which may cause damage to the environment or to property, or endanger life or health."30/ Apart from this scant enlightenment, the legislative history leaves the questions unanswered. Put another way, the implementing agency will have to exercise its discretion, and our judicial system will have to decide if the exercise was reasonable in context.

Congress likewise provided little guidance as to when "the incremental benefits are clearly insufficient to justify the incremental costs of utilizing" BAST. Provisions for economic weighing and balancing were added at the suggestion of the Secretary of the Interior.31/ H.R. 1614, as introduced by Representative Murphy early in 1977, applied BAST in every case where failure of equipment would have a significant effect.32/ Interior's suggested language was incorporated into S.9 and read:

> ...which the Secretary determines to be economically achievable, taking into account the incremental costs and benefits of utilizing such technology, wherever failure of equipment...33/

In explaining his proposed economic analysis amendments to the OCS bill, Secretary of the Interior Cecil D. Andrus stated that he did not want standards imposed that were so costly as to prohibit the extraction of oil and gas.34/ The amendment was strongly criticized by witnesses at both the Senate and House hearings. A representative of the Natural Resources Defense Council said it "would so seriously limit the requirement of best and safest technology as to render its value meaningless."35/ A representative of the Center for Law and Social Policy stated the economic analysis would introduce so much uncertainty "as to raise a question whether there would be any meaningful statutory standard regarding use of the best available and safest technology."36/

The language was subsequently amended by separating the "economically achievable" and cost-benefit language, and by adding a "clearly insufficient" test to the cost-benefit analysis. "Clearly insufficient" introduced a preponderance test intended to place the burden of proof on those challenging the use of BAST.

The language suggested by the Department of the Interior clearly indicated that the determination of economic achievability was linked to a cost-benefit analysis. As reported out of Conference (and as passed), the language was sufficiently changed to leave that link in doubt. The Conference Report, however, states that "the language provides for economic feasibility to be a balance of costs against benefits."37/

Similar economic balancing provisions are contained in related environmental legislation. The Clean Water Act's "best available technology economically achievable" is restrained not by a formal cost-benefit analysis, but by a "reasonableness" test instead. The test is whether costs are substantially out of proportion to expected benefits.38/

The Port and Tanker Safety Act of 1978 declares:

> that standards developed through regulations shall incorporate the best available technology and shall be required unless clearly shown to create an undue economic impact which is not outweighed by the benefits...39/

The legislative history of that Act makes explicit that the economic analysis is left to administrative discretion.

> The regulator is to balance the significance of the procedure or piece of equipment on safety. If adoption of new techniques or equipment would significantly increase safety, and would not be an undue economic hardship on the lessee or permittee, he is to require it.

The test for "undue economic hardship" is the "clearly insufficient" benefit-cost analysis.40/

To a great extent, the determination of BAST is also given to administrative discretion. During the debate on the singular versus the plural of the word "technology," Representative William J. Hughes of New Jersey observed that "The Secretary has the flexibility to determine under the circumstances which is the best and safest general technology available to the industry."41/ When the meaning of "safest" was questioned, Hughes said the definition was up to the Secretary, adding that "The Secretary has to make a lot of determinations or value judgments."42/

The Department of the Interior and the USCG were given discretion to carry out the mandated "broad public policy considerations."43/ As to the application of BAST, testimony and questioning at relevant hearings indicate that small, individual elements of an OCS operation were not the object of a BAST specification.44/ BAST were not to be applied installation-by-installation, company-by-company, or lessee-by-lessee. Instead, agencies were to implement the requirement in a reasonable, discreet manner on an industry-wide basis or with respect to classes or categories of operations.45/ In the case of offshore operations, these classes or categories may include either the geology of the region, the environmental conditions, or the types of structures being installed.

Concluding Comments

During the legislative hearings on the Act, industry representatives testified that the offshore oil and gas industry already uses the best technologies, because it's good business to do so.46/ Nevertheless, the amended act instructs the Executive Branch to monitor and regulate the range in quality and to apply BAST. By requiring the use of BAST, Congress sought to assure the "highest degree" of safety in OCS operations.47/ In doing this, it did not overlook the possibility of unreasonable application of BAST. To compensate, an economic balancing process was mandated.

The OCS Lands Act Amendments clearly did not intend to require a single best technology.48/ However, they did intend that the existing technologies be reviewed and the best available be applied when practicable. The amendments could also be interpreted to mean that new technologies should be developed if the existing technologies were proved to be inadequate. Furthermore, although the intent of the law is that newly developed proprietary technology should be made broadly available, the companies that developed and/or owned them may not be willing to share them. Some consideration may have to be given to this in the implementation of BAST.

Agency Programs Related to Section 21 of the OCSLA

Section 21 of the OCSLA requires that the Secretary of the Interior and the Secretary of Transportation:

- Conduct a joint study of the adequacy of existing safety and health regulations and of the technology, equipment and techniques available for the exploration, development, and production of the minerals of the OCS;
- Submit the results of the study to the President who shall prepare a plan to promote safety and health on the OCS; and
- Require the use of BAST on the OCS.

Acting for the Secretaries, the USGS and the USCG have had to address these additional requirements for OCS safety in the context of existing programs.49/ The Department of the Interior views the Subsection 21 (a) requirement for a study of OCS safety as another in a series of major assessments of OCS technology that it has undertaken or supported over the past decade. Previous studies have included an internal study by the USGS, studies by a team of experts from the National Aeronautics and Space Administration, and the National Research Council, a technology assessment by the University of Oklahoma, and an environmental assessment by the President's Council on Environmental Quality.50, 51, 52/ In addition, a panel of the Marine Board of the National Research Council conducted a continuing review of the safety of OCS oil and gas operations, which culminated in the publication of four technical reports on OCS safety.53/ Most of the studies were completed by 1974. As a result, the USGS took several internal actions that led to important changes in the agency's programs and regulations. Accordingly, in June 1977 the USGS published a comprehensive description of its policies, practices, and responsibilities for OCS oil and gas development.54/

To provide information and make recommendations relative to safety on the OCS, and especially to assist the USGS in implementing the Subsection 21 (a) safety study, the USGS has recently requested that the National Research Council form a committee to advise the USGS on OCS safety and to prepare the technical base to assist them in implementing the Subsection 21 (a) safety study. The National Research Council committee will address such issues as the technology, procedures, and training to advance safety, the adequacy of existing regulations for the safety of OCS oil and gas operations, and the institutional assignment of responsibilities, including coordination, in the development and administration of OCS oil and gas operations.

While the Geological Survey's OCS regulatory authority is less than 30 years old and is tied to a specific statute, the OCSLA of 1953, the Coast Guard's regulatory authority relates generally to its responsibility for maritime safety and for the safe operation of vessels and floating ocean structures. The USCG regulatory function for maritime safety began over 100 years ago to help prevent disasters at sea caused mainly by boiler explosions on steamships. As a result, the USCG developed design and inspection standards for steamship boilers.

As the rate and intensity of technological growth increased over the years, the USCG regulatory process, in a manner similar to that of many other governmental agencies, was directed toward anticipating and preventing problems before they occurred. Today's Coast Guard regulations have been created and updated as a result of casualty and accident investigations, studies, and R&D work on development and use of consensus standards, innovations by industry, and analysis of inspection violations.

Preventive regulation, as practiced by the USCG, consists of a joint effort with industry, owners, other agencies, standards groups, certification groups, and other interested parties. Committees of the standards and certification groups are composed of manufacturers, suppliers, inspectors, and jurisdictional authorities. Such committees continuously review standards and regulations, making recommendations for timely changes when these appear necessary.

In response to the committees and to inspection and casualty experience the USCG drafts new regulations or changes existing ones to correct hazardous situations that are developing or to cover new areas created by technical changes and developments. Through the system of Advance Notice of Proposed Rulemaking and Notice of Proposed Rulemaking, the public has an opportunity to participate in the development of regulations. The overall result is a system of rulemaking that is responsive to broad base, is modest in cost, and is flexible enough to change quickly as technology advances. (The USCG regulations relevant to safety on the OCS are described in Appendix D.)

HUMAN SAFETY ON THE OCS

A number of existing and proposed regulatory programs bear on the development and use of offshore technology. Such programs are designed to minimize environmental impacts and to maximize reliability and safety, within the limits of economic feasibility. The majority of the programs are administered by the Department of the Interior and the Department of Transportation. (A description of selected existing and proposed programs that specifically address OCS safety and environmental protection is contained in Appendix D.)

In addition to regulating for human safety, government agencies monitor the operating performance of the offshore oil and gas industry, and accumulate much information regarding safety and technology. Data on OCS incidents, including blowouts, explosions and fires, pipeline breaks or leaks, and significant pollution incidents, have been accumulated by the USGS since 1956.55/ Data on the operating practices and physical conditions that have resulted in accidents on the OCS are available from the USGS's Safety Alert Program, which was instituted in 1972. Each year, several thousand on-site inspections of offshore platforms and drilling rigs are conducted by the USGS and the USCG to assure that lessees and third parties comply with the safety and pollution prevention requirements set forth in rules and regulations and OCS Orders, and that they are in compliance with plans and applications approved by government agencies. Reports of these inspections provide insight into operator compliance and performance. An abundance of other performance data is available through documentation and reports that have been required for many years by OCS Orders, which prescribe operating procedures and requirements in specific offshore areas.

Role of Government Agencies

The government's offshore regulatory programs have developed over a period of nearly 30 years as needs have been identified through accidents occurring in oil and gas operations resulting in the loss of life and property and the pollution of the environment. As offshore operations increased and matured, government and industry studies were performed with the aim of improving safety and controlling pollution of OCS oil and gas operations. These studies produced recommendations that were incorporated later into regulatory programs. In recent years, steps have been taken to conduct some research and development under contract to support the development of regulations.56/

The current OCS regulatory system is complex. Offshore operators must secure permits or approvals for virtually all OCS activities; submit numerous operational reports; maintain many historical records; prepare formalized operating plans; and conduct training of appropriate personnel. Furthermore, present federal review, approval, and inspection procedures apply to new technological developments, just as they do to existing technology.

Within the government, responsibilities for OCS development are scattered throughout several departments.57/ In its role as manager of the U.S. energy supply, the Department of Energy (DOE) is charged with setting exploration and production goals that influence the pace of OCS development. In its statutory management of public lands, the Bureau of Land Management (BLM) auctions leases at a pace set by DOE. The USGS assesses the value of mineral resources on public lands, supervises resource exploitation and operations, and performs other management functions on leased lands. The Army Corps of Engineers (COE) licenses structures attached to the continental shelf. The Environmental Protection Agency (EPA) and Department of the Interior set air and water quality standards that offshore operations must comply with. Safety aspects of operations are under the purview of the USCG as well as the USGS. Among those agencies with specific OCS programs, there are numerous areas where responsibilities remain unclear because of overlaps, uncertainties, or gaps in coverage.

The agency that has the most significant role in the regulation of offshore oil and gas operations is the Geological Survey. USGS requirements are contained in OCS regulations (30 CFR250), which apply nationwide; OCS Orders that cover areas such as the North, Middle, and South Atlantic, the Gulf of Mexico, the Pacific, and the Gulf of Alaska; OCS Standards; field drilling rules; Notices to Lessees; and special letters of instructions to individual operators.58/ Statutory authority for the USGS regulatory program is contained in the OCSLA.

The USGS regulatory program has evolved in a dynamic manner, and in recent years has been greatly expanded by the addition of numerous detailed requirements. Currently, Orders 1-5, 7, 8, and 12 for all OCS areas are being revised, as is the entire 30 CFR Part 250. The central objective of this major revision of regulations is to strengthen the technological basis for the USGS regulatory program. For example, in the last revision of OCS Order 8 (October 1, 1976), which covers platforms, structures, and associated equipment, 15 industry documents that establish and describe relevant industry technical standards were incorporated into the order by reference.

Role of Operating Companies

Operating companies engage in exploration, development, and production of offshore oil and gas. By 1977, more than 21,000 offshore wells had been drilled in U.S. waters, with a cumulative production of some 7.5 billion barrels of oil and condensate and 41 trillion cubic feet of gas. Most of this has been in the Gulf of Mexico. Furthermore, most offshore technologies that are in world-wide use today were developed originally in and for the Gulf of Mexico. The world-wide expansion of offshore activity to deeper waters and into more remote regions, where more stringent environmental conditions needs to be met, has introduced many challenging technological problems. The technological solutions to these problems that are being proposed and developed are, in general, extensions of technologies developed for the Gulf of Mexico.59/

Operating companies take the lead in developing technologies and providing money and direction, and also in assuming responsibilities for the safety of personnel and the environment. Over the years, many operating companies have expended millions of dollars in research and development programs to develop safe and reliable offshore technologies. Industrial associations and technical societies such as the American Petroleum Institute, International Association of Drilling Contractors, Society of Petroleum Engineers of the American Institute of Mining, Metallurgical and Petroleum Engineers, and others have provided forums to exchange ideas, disseminate technological information, solve mutual problems, and establish industry-wide standards. Also, industry has responded to recommendations for standards development arising from studies of safety of OCS operations, such as those conducted by the National Research Council.60/ Examples are the standards and recommended practices prepared under the jurisdiction of the American Petroleum Institute Committees on Standardization of Offshore Safety and Anti-Pollution Equipment (OSAPE) and Offshore Safety and Anti-Pollution Training and Motivation (OSAPTM).

In order to minimize the effects of an oil spill, industry has formed cooperatives such as Clean Gulf Associates and Clean Atlantic Associates to conduct clean up operations. Their efforts, however, are limited by inadequate capabilities to handle large spills and by extreme weather conditions.

Through organizations such as the Offshore Operators Committee, industry cooperates with state and federal agencies by providing technical information so that effective regulations can be developed and updated. Offshore operators also devote considerable effort to complying with government regulations. For example, one major oil company has established that it devotes the equivalent of 1,100 employees at a cost estimated to be about $80 million a year to the job of complying with federal regulations.61/

The Role of Third Parties

In developing OCS resources, offshore operators obtain a wide array of services and hardware from contractors, manufacturers, and service companies. The lessee or operator is responsible for the regulatory compliance of third party operators on the OCS. For example, the operator must ensure that a contract drilling rig complies with all provisions of OCS Order 2. As another example, the operator is accountable if a common-carrier pipeline company does not comply with all requirements of Order 13 in the installation and operation of all facilities at measurement terminals or offshore sales points, even though such facilities are not operated or owned by the operator.

The Record of Safety on the OCS

The first offshore drilling operation occurred off Santa Barbara, California, in 1924. By January 1978, there were 364 manned platforms, 2,168 fixed structures of all types, 1,200 supply and support vessels, 105 mobile drilling units, 175 separate diving operations, 46 construction and pipelaying barges, and over 27,000 individuals involved in oil drilling on the outer continental shelf of the United States.62/

Significant advances in drilling, marine construction, pipelaying and many other technologies have paced the tremendous growth of this major industry. Despite this and despite the best efforts of industry and government, accidents have occurred on the OCS, some of major proportions.

The USGS has accumulated considerable data on accidents in OCS oil and gas drilling and production operations. Detailed study and analysis of all available information is needed in order to draw firm conclusions and to compare the OCS safety record with the record of safety in other industries.

The USGS regularly inspects OCS operations to monitor compliance with its regulations. Currently, 80 inspectors work on the OCS. During fiscal year 1978, a total of 4,137 drilling inspections and 3,725 production inspections were conducted. These resulted in 1,983 warnings issued, and orders to 70 platforms and 1,180 producing zones to cease all operations.

The USGS also operates a Safety Alert Notice Program. From September 22, 1972 to March 16, 1979, the USGS issued 84 Gulf of Mexico Safety Alerts describing 100 events. In all, 43 of the 100 events occurred in the process system of production facilities. The remainder involved drilling rigs, workover rigs, ships, or human errors. Analysis shows that only 11 of the events might possibly have been prevented or mitigated by improvements in system reliability. There were no fatalities and only two personnel injuries in the 11 incidents. Pollution

and damage to equipment were minimal. (Table I, prepared by the panel from data obtained from the USGS, provides a listing of safety-related incidents on the OCS from 1971-1978.)

The USGS defines a major accident on the OCS as one in which more than 10,000 gallons (238 barrels) of oil is spilled or a blowout, explosion, fire or other catastrophe causing loss of life or significant structural damage. Since the onset of recordkeeping in 1956, 81 major accidents have been reported on the OCS in the Gulf of Mexico. Of these, 24 have involved loss of life. Major structural damage to a rig, platform, vessel, or well occurred in 44 incidents. Major oil spills occurred in 26 incidents, though only one of these required land cleanup of spilled oil.

Table II was developed by the panel from information supplied by USGS to provide a statistical summary of certain factors which characterize the major accidents that have occurred in the Gulf of Mexico.

While 11 major accidents occurred in the Gulf of Mexico OCS in 1978, on the average fewer than 4 major OCS accidents occur each year. From 1971-75, federally supervised offshore operations in the Gulf of Mexico have resulted in the spillage of 0.0028 percent of oil produced.63/ In this period, 1,765,079,000 barrels of oil were produced by these operations.64/

TABLE I

Safety-Related Incidents on the OCS 1971-1978

	1971	1972	1973	1974	1975	1976	1977	1978
Blowouts	7	3	3	5	6	6	9	11
Explosions	17	30	30	22	31	32	33	38
Pollution Incidents (50 bbls or more)	11	2	4	8	2	3	4	2
Pipeline Leaks or Breaks	2	1	1	3	0	1	3	1
Fatalities	11	19	1	12	16	13	13	20

TABLE II

Characteristics of 81 Major Accidents
on the Gulf of Mexico OCS 1956-1978

OIL BLOWOUT	GAS BLOWOUT	EXPLOSION	HURRICANE
5	26	16	8

WELDING	COLLISIONS & RELATED PROBLEMS	STRUCTURAL OR EQUIPMENT FAILURE & OPERATING AND WORKOVER DIFFICULTIES	ANCHOR DRAGGING	OTHER PIPELINE
4	11	19	3	6

NOTE: The USGS defines a major accident on the OCS as one in which more than 10,000 gallons (238 barrels) of oil is spilled or a blowout, explosion, fire, or other catastrophe causes loss of life or significant structural damage.

CONSIDERATIONS IN IMPLEMENTING THE BAST REQUIREMENT

At least 11 government agencies regulate offshore oil and gas exploration and production. The Bureau of Land Management grants the basic mineral lease. It also grants rights of way and easements for pipelines. In certain instances, the BLM requires that operators perform underwater archeological surveys before the ocean bottom can be disturbed to construct a pipeline or structure. The USGS is required to consult with and receive recommendations from the Bureau of Land Management and the Fish and Wildlife Service prior to granting approvals to construct pipelines or structures. The USCG is authorized by law to issue and enforce regulations with respect to safety equipment and other matters relating to the promotion of safety of life and property on artificial islands and fixed structures on the OCS. The Coast Guard is also the agency authorized to coordinate the containment and cleanup of any major pollution that might occur, and all oil spills are reported to that agency. The Materials Transportation Bureau (MTB) has authority over common carrier pipelines and claims jurisdiction over many producer-operated oil and gas pipelines in accordance with a memorandum of understanding between MTB and the USGS. A permit from the Corps of Engineers is required whenever anything is constructed that might obstruct navigation. All point-source discharges of any pollutant, such as produced water, treated sewage, or drilling fluids, require permits from the EPA. The Occupational Safety and Health Administration claims jurisdiction for personnel safety and health on the OCS, even though the Coast Guard is charged with enforcing safety regulations. Under the terms of the OCS Lands Act, the Department of Energy is authorized to promulgate regulations that bear on economic aspects of offshore production, such as establishing diligence requirements and setting rates of production for the OCS. Through its control of radiowave communications frequencies, the Federal Communications Commission also has a hand in OCS regulation.

Inevitably, with such a profusion of regulatory responsibilities, there is occasionally a perceived overlap in regulatory authority. Table III is a preliminary tabulation prepared by the Coast Guard in conjunction with the USGS as the basis for a revised Memorandum of Understanding between the two agencies. It displays possible areas of overlapping jurisdiction between the USGS and the USCG in the regulation of fixed installations on the OCS. A review of Table III indicates that many of the technical areas of jurisdictional overlap are areas in which safety is a paramount concern.

TABLE III

Areas of Overlapping Jurisdiction Between the USGS and USCG in the Regulation of Fixed Installations on the OCS

Item	Responsibility USGS	Responsibility USCG	Remarks
Structure Design, Construction, Alteration, Repair and Installation			
Bottom Resting			
a. Jacket-type	X		
b. Gravity	X		
c. Jack-up (permanent)	X		
Bouyant			
a. Column Stabilized	X	X	Joint. USGS takes
b. Tension Leg	X	X	seabed soil mechanics.
c. Jack-up (temporary)		X	
Arrangements			
Structural Fire Protection		X	
Passageways, Egress & Escape		X	
Accomodation Spaces		X	
Helicopter Facilities		X	
Auxiliary Machinery and Electrical Spaces			
General Arrangements		X	
Fire Protection Systems			
a. Installed (Fixed)		X	
b. Portable		X	
Auxiliary Machinery and Electrical Equipment		X	
Detecting System			
a. Fire	X	X	Could be joint
b. Gas	X	X	responsibility
Lifesaving Systems		X	
Pollution Prevention			
a. Drilling or Production Operations	X		
b. Supporting Operations	X		
c. Effluents	X		
d. Oil Terminal Operations		X	
e. Fuel Transfer		X	
f. Adequacy of Pollution Response Equipment		X	

Item	Responsibility USGS	Responsibility USCG	Remarks
Welding and Burning Control			
a. Related to Drilling and Production Operations	X		
b. Personnel Safety		X	
c. Special Welding Repair Procedures	X	X	Interest determined by item repaired (e.g. on structure-USGS; on industrial equipment such as crane booms-USCG)
Production System			
a. Design, Installation and Operation	X		
b. Safety Control Systems	X		
Drilling and Workover Equipment			
Well Control and Safety Equipment	X		
Operational Procedures			
a. Drilling Operations Including Emergencies	X		
b. Production Operations Including Emergencies	X		
c. Emergency Fire	X	X	
d. Emergency Abandonment		X	
e. Pollution Incidents	X	X	
Casualty Investigations			
a. Loss of Life	X	X	Interest determined on basis of regulation. USCG is primary agency for worker safety
b. Incapacitating Injuries	X	X	
Investigation of Complaints and Alleged Violations	X	X	
Personnel Safety & Health		X	
Diving Systems		X	
Marking of Structures	X	X	Either or both agencies may be responsible depending on area (i.e. USCG for navigational aids, helideck markings for search & rescue; USGS for platform name)
Transfer and Stowage of Hazardous Materials		X	

Item	Responsibility USGS	Responsibility USCG	Remarks
Accident Investigation			
a. Fires and Explosions	X	X	Could use same language as in current MOU on Mobile Offshore Drilling Units
b. Blowouts	X		
c. Collision by Ships		X	
d. Other	X	X	
Pipeline Safety Systems	X		
Development of Standards, Regulations, Orders and Notices	X	X	Could use similar language to that in current MOU on Mobile Offshore Drilling Units
Effects of Oceanographic, Meteorological, Geological, Geophysical Conditions at Particular Structure Location	X		
Regular Inspection of Drilling and Production Operations	X	X	
Structure Reverification (Structural Integrity)	X	X	USGS - Fixed bottom bearing; USCG - Floating and temporary bottom bearing units
Structure Removal	X		

In matters concerning safety, it is vital that regulations be readily understood by those who must comply with them. At the least, the strategy that is pursued to implement the BAST requirement should not add to regulatory confusion on the OCS. Perhaps it will even be possible to administer the BAST requirement in a way that helps to clarify responsibilities for OCS safety.

Developing the Technological Capability to Implement the BAST Requirement

To implement the BAST requirement, the government must have the technological capability to determine the best available and safest technologies. Technological capability encompasses:

- Sufficient manpower and financial means to implement programs.
- Ability to identify technical problems, conduct R&D, and develop and implement technical programs in a manner that supports and expedites resource development.
- Efficient coordination of programs, and coordination with industry to achieve common objectives.

The subject of technological capability to manage OCS programs has been discussed extensively in other Marine Board reports.65/

As described in the next chapter, how the BAST requirement is effectuated will influence the degree of technological capability that is required. At a minimum, the government needs administrative procedures and manpower to assure and monitor compliance with BAST. It may also develop (or contract for) the capability to evaluate technologies to determine which is the best available and safest. Conceivably, it might even be necessary for the government to invest in or conduct R&D to develop some technologies for OCS safety. However, although additions to technical staff within the government may be desirable, the variety, scope, and dynamics of the technologies employed in OCS exploration, development, and production activities may make it difficult and possibly not cost-effective to attempt to assemble in-house a group of experts capable of assessing the merits of all technologies afecting the safety of offshore operations. Even within the industry, it should be noted, no single organization has the resident expertise to analyze the design of each piece of equipment used in OCS operations.

Economic and Other Technical Considerations

The BAST requirement is applicable to all operations wherever failure of equipment would have a significant effect on safety, health, or the environment, provided that BAST are economically feasible, and

except where the incremental benefits of using BAST are clearly insufficient to justify the incremental costs. This section comments on the determination of economic feasibility and the calculation of incremental benefits and costs.

Subsection 21 (b) of the OCSLA requires the use of the BAST "...which the Secretary determines to be economically feasible." A particular application of BAST will be economically feasible if it does not impose costs so great that offshore production of oil and gas is impeded. Necessarily, the Secretaries of the Interior and Transportation must determine economic feasibility without resort to detailed standards.

Subsection 21 (b) also requires the use of BAST "...except where the Secretary determines that the incremental benefits are clearly insufficient to justify the incremental cost of utilizing such technologies." This provision raises two technical problems. First, the question of balancing benefits and costs is related to the determination of acceptable levels of risk for OCS oil and gas development. Second, while the calculation of incremental costs may be a straightforward economic problem, it may not be possible to quantify incremental benefits with the same degree of reliability.

In balancing incremental benefits and costs, it will first be necessary to determine acceptable levels of risk for offshore operations. Some dispute the need for taking any human or environmental risk in the recovery of OCS oil and gas. This is reflected in current public policy that seeks to minimize risk in the OCS working and physical environment. Yet, inevitably, a point will be reached beyond which reductions in risk will not produce additional benefits in the form of greater safety. The review of the OCS safety record in the previous section indicated that the risks inherent in the present level of technology will continue to produce several (although few) deaths, structural failures, and significant oil spills per year. The introduction of new technologies could affect this level of risk. Before calculating the incremental benefits and costs of new technologies, it will be necessary to assess the effect of new technologies on the level of risk offshore.

The problem with calculating incremental costs and benefits centers on the quantification usually involved in this kind of calculation. It is usually possible to calculate costs. To a certain extent, it is even possible to calculate the reduction in risk that will result from the introduction of new technologies. However, calculating benefits associated with new technologies and lower risks requires quantifying items such as human life, which cannot be evaluated in money, and environmental protection, which may be very difficult to figure in dollars or numbers. Thus, it is not possible to provide any more detailed guidance on this point than to say that there must be a reasonable relationship between the costs of a technological innovation and the benefits that are likely to result from its commercial use. Rigorous cost-benefit analyses of specific applications of BAST are likely not to be productive. In administering this provision it is evident that the presumption is in favor of BAST unless it is clearly shown that the benefits are insufficient to justify the costs.

Criteria for Evaluating Approaches for Implementing the BAST Requirement

Engineering management includes technology development, design and design approval, performance, and accident response. Within each of these elements, the engineering manager must be concerned with matters pertaining to hardware, personnel, and operations. In considering how to implement the BAST requirement, it is necessary to evaluate the probable consequences of implementation within the context of engineering management. The panel has developed the following tentative criteria for a discussion of how one might implement the requirement.

- The program must be effectve. It must achieve the statutory purposes of the OCS Lands Act. Specifically, the program must be economically feasible. It must provide for a proper balance of costs and benefits.

- The program must be efficient. It must be capable of being implemented in a timely and cost-effective manner, and avoid undue regulatory burdens.

- The program must encourage (and not constrain) the technological capability of the petroleum industry to develop offshore oil and gas in a safe manner.

- Implementation of the BAST requirement could conceivably force the development of technology necessary to provide a greater degree of safety. Alternatively, it could also inadvertently freeze the development of technology.

- Implementation of the BAST requirement must minimize any adverse effect on the competitive position of the U.S. offshore oil and gas industry.

- The program must foster public participation. It should provide for the participation of all interested parties in the development and implementation of requirements.

- Giving effect to BAST must enhance the public credibility of both government and industry with regard to human and environmental safety in OCS development through achieving improvements in safety of operations.

DISCUSSION OF APPROACHES FOR IMPLEMENTING THE BAST REQUIREMENT

The panel framed approaches to describe and explore different forms that a BAST program could take. In developing and evaluating the approaches, however, it became apparent that no single approach could be recommended over the other. On the contrary, each approach contains necessary and important program elements for the implementation of the BAST requirement. Rather than describing unrelated approaches to a BAST program, the approaches actually describe scenarios at different points in a continuum. The continuum represents the degree of government involvement in and technological capability for managing a BAST program.

I. Minor Modification of Present Practices to Assure that the Best Available and Safest Technologies (BAST) Are Used on the OCS

The Strategy

1. Existing economic incentives and regulatory requirements already provide for the use of the best available and safest technologies on the OCS.

2. The BAST requirement would be formally recognized and incorporated in existing OCS regulations.

3. The Subsection 21 (a) safety study would be vigorously conducted. The study would be a continuing evaluation, testing, and analysis of OCS safety. Conduct of the study would provide the opportunity to review the historical record of OCS operations and government regulations in order to uncover specific aspects of operations where some additional regulatory or other governmental emphasis may be needed. The study is needed because much of the information relative to safety that the government collects has never been documented, codified, or analyzed to the extent necessary to assess accurately the current state of technology or to reflect the intensive regulation of the offshore industry. Actions indicated by the study

would be expeditiously acted upon. Specific incremental improvements in the system can be handled easily within the framework of the existing regulatory system without additional administrative burdens on both government and industry or slowing down the exploration and development of badly needed domestic energy supplies.

4. To implement this approach, the government must have the capability to assure and monitor compliance with the BAST requirement, to conduct the safety study, and to act on the results of the study.

Discussion

The premise of this approach is that, in singling out the BAST concept in the OCSLA, Congress did not discover a new field of endeavor. Industry and government, in their respective roles, have been working together to achieve the goal of BAST for many years. An important point in support of this approach is industry's demonstrated record of good performance in over fifty years of offshore oil and gas development.

This approach involves neither significant manpower and financial commitment nor regulatory burdens. This is in accordance with Executive Order 12044 on improving government regulations. The Executive Order requires that new regulations shall not be developed until the need for and purposes of the regulations have been clearly established, meaningful alternatives have been considered, and compliance costs, paperwork, and other burdens on the public have been minimized. Because this option relies on industry's technological capablity to achieve a major national policy objective (safety on the OCS), this approach would contribute to maintaining a healthy climate for technological development. Furthermore, the competitive position of the U.S. oil and gas industry would be enhanced because the added costs and delays that might result from additional government regulations would be avoided.

Through reliance on existing arrangements, this approach would continue the present level of public participation in OCS decisionmaking. The approach, involving completion of the Subsection 21 (a) study and action in pursuance of it, could contribute to the credible assurance of the public that government and industry are "on top" of the situations.

However, in this approach the government would continue to rely heavily on industry consensus. Hence, it is possible that following this approach could stimulate pressure from some states and environmental groups for additional assurances that oil and gas operations are being and will be conducted in the best and safest manner, especially in frontier areas.

II. A Procedural Approach to Implementing the BAST Requirement

The Strategy

1. Incorporating and building on Approach I, industry would be expected to give particular attention to BAST issues in the course of OCS development. Of particular importance in areas where there is little operating experience, such as frontier areas, is the need to understand and characterize the environment and environmental conditions to an extent in which the technological requirements for safety will be better known.

2. In the course of reviewing and acting on permits, plans, and licenses, the government would require, where appropriate, that an operator justify that his proposals assure the use of BAST. This would occur most often in areas where there is little operating experience and inadequate knowledge of the environment in areas characterized by high risk, or in instances of need, such as those that may be revealed by the Subsection 21 (a) safety study.

3. In instances of demonstrated need (in response to results of the Subsection 21 (a) safety study, accidents, or equipment failure, the government would have the authority to invest in and initiate the development and testing of technological solutions to problems.

4. An organizational mechanism for coordination would facilitate implementation and compliance by clarifying and fixing responsibilities among government agencies.

The basic thrust of this approach is for concerned government agencies, primarily the USGS and the USCG, to adopt procedures and follow a process that will assure and document the careful and rational implementation of the BAST requirement. This means that the agencies would focus on BAST issues in the granting of permits and in the issuance or modification of regulations and orders. An applicant for a permit would be required to address BAST issues in its submission, setting forth the facts and considerations the applicant thinks relevant. Whenever an agency contemplates or proposes a new order or regulation, it would invite comment on the BAST issues from all interested persons. Whenever the agency made a decision on a permit or new regulation or order, it would focus carefully on the risks in the event of equipment failure; the relative costs and economic feasibility of using particular technologies; and the balance between costs and benefits of those technologies. A related factor may be the need for more, and more detailed, inspection of OCS facilities.

Government agencies would take the initiative in assessing risks, considering possible new technologies and evaluating their costs, independently of the decision process on permits, regulations, and orders. The agencies would have in use a procedure that allows manufacturers, experts, and the public--as well as operators--to facilitate the evaluation of technological developments and the need for them in OCS operations. This procedure would include methods for taking account of new technologies that have been proved reliable in operating conditions and that meet the needs identified from documented deficiencies in existing operating methodologies.

With regard to the usefulness of organizing to clarify and fix responsibility for BAST the regulation of OCS safety historically has been divided between and shared by the USGS and the USCG, on the basis of which facilities were fixed and which were floating. As the two agencies primarily concerned organize to assure the use of BAST, they need to consider alternate ways of administering the BAST requirement, including perhaps designation of a lead agency for coordination with respect to OCS safety.

Discussion

As in Approach I, the procedural approach relies on industry for the reduction of risk and the continued development of technology as needed and in response to economic incentives. However, in some circumstances the government would take the initiative in developing new and safer technologies. Through requiring consideration of BAST issues as an integral component in the regulatory process, the procedural approach would probably provide for more thorough consideration of operating risks.

To implement these procedures and fulfill these responsibilities, government agencies would require additional funding and more personnel of the necessary qualifications. Clarification of responsibilities could minimize the financial and manpower resources that would be called for.

This approach would place additional requirements, and therefore burdens, on industry, as it would on the government. It also would provide additional opportunities for exchange of views between the government, industry, and the public. As a result, government and industry credibility would be enhanced, leading to an improved overall climate for OCS development.

III. A BAST Standards Development Program

The Strategy

1. Incorporating and building on Approaches I and II, a special BAST unit would be established in the government. It would be jointly staffed by appropriate departmental personnel.

2. The BAST unit would develop the technological capability necessary to provide a basis for:

   - o evaluating technologies; and,
   - o developing new technology in promising areas.

3. On the basis of these activities, the government would then develop and utilize performance standards to ensure the use of BAST.

Under this arrangement, the initiative to develop technological standards would rest with the government. Technological standards could be applied on an industry-wide basis or with respect to classes or categories of operations.

In implementing the process of standards development, the government could proceed in the following manner:

- o Establish policy objectives for implementation of the BAST requirement. Presumably these would be derived from the OCSLA.
- o See that a data base is assembled on environmental conditions to be met as well as other factors that bear on technological safety.
- o Inventory and evaluate available offshore oil and gas technologies to determine which are the safest. The safest technologies are those that are characterized by the lowest level of risk.
- o Assume a leadership position in the development of performance standards to assure the use of BAST. Examples of such leadership include a) surveillance of operations to identify areas where new or revised performance standards are needed and appropriate and b) encouraging existing standard setting organizations to develop such needed performance standards. Whether developed directly by the government, under contract, by a trade association, or by a national standards organization, the most credible standards will be consensus standards approved by a national standards organization.
- o Modify performance standards as necessary to achieve an acceptable level of risk, and to ensure that performance standards support policy objectives.
- o Evaluate the economic and technological feasibility of performance standards, retaining all which can be implemented within the range of costs usually associated with OCS exploration and development.

- Invest in technological development to meet performance standards as justified by economic considerations.

This approach is based on the approach developed by the Environmental Protection Agency in the implementation of the "Best Available Control Technology (BACT)" requirements of the Clean Air Act as modified by the panel in order to incorporate comments received from the public.

Discussion

An underlying assumption of this approach is that in certain instances industry, in responding to the marketplace, may not identify, produce, and adopt the best available and safest technologies. As a result, the government must take the lead in enhancing safety through developing and utilizing performance standards for offshore technology whenever necessary. If technology is not available to meet the performance standards and if there are inadequate incentives to produce such technology, the government must be prepared to invest in the development of the needed technology.

Establishing a BAST standards development program would be a major departure for the government and would require the commitment of financial and manpower resources significantly beyond those required by the first two approaches. The most important element in establishing such a program would be the necessity for the government to develop and maintain sufficient independent technological capability in offshore technology to evaluate technologies, to participate in standards development, and to assure compliance with standards.

While government investment in technological development may be more cumbersome and less efficient than the industry investment, it would be focused solely on the needs of the BAST requirement. Thus, while it could take longer to implement BAST under this approach, the end result could well be greater certainty in the regulatory system. It might also result in increased rigidity in the regulatory system. It is likely that in some instances development of more specific performance standards could freeze the level of technology that is developed and commercially utilized. On the other hand, performance standards could be used to force the development of technology.

A BAST standards development program could also directly affect the structure of the offshore oil and gas industry because, under this approach, incentives for industrial development of technology for safety would come directly from the government as well as from the marketplace.

To the extent that the effort to comply with performance standards for safety diverted manpower and resources from the development of other technology needed in the marketplace and from the job of energy resource development, it is possible that this approach would have an adverse effect on the offshore oil and gas industry, including its

competitiveness. Because this approach would involve government directly in the development of best and safest technologies, it would provide, through political, administrative, and funding processes, for the increased participation of interested parties in the implementation of the BAST requirement. Regarding the credibility of such a program, it is likely that a BAST development program would be considered credible by all except industry, which would maintain, perhaps rightly, that government is inexperienced in offshore technology development and that industry could develop BAST more efficiently and cheaply.

CONCLUSIONS

The panel concluded that implementation of the BAST requirement will be an evolutionary process. Nevertheless, implementation should begin promptly. This is necessary to enhance and maintain the excellent historical record of safety and environmental protection on the OCS and to provide additional assurance to the public that oil and gas operation on the OCS are being conducted in the best and safest manner.

The panel also concluded that the Secretaries of the Interior and of Transportation should conduct promptly and expeditiously the study called for in Subsection 21 (a) of the OCS Lands Act. However, initiating the process of implementing Subsection 21 (b) should not be postponed pending completion of the study.

The recommendations that follow describe major concerns that need to be taken into account in implementing BAST. The recommendations are listed in priority order.

RECOMMENDATIONS

1. The USGS and USCG should take steps to assure that they have the technological capability to assess and evaluate OCS technologies and technological developments for the purpose of discharging their responsibilities under subsection 21 (b) of the OCS Lands Act Amendments.

Adequate personnel is an important element in technological capability. The government will require additional expertise for the implementation of the BAST requirement. A rigorous personnel analysis should be conducted in support of implementation of the BAST requirement. The analysis should identify the kinds of trained skills and professional judgments that are needed to conduct the additional program management, field inspection, and technological evaluation services associated with implementation of the BAST requirement. Additional expertise can be obtained by hiring personnel directly or by retaining qualified contractors.

2. Duplication and contradiction in the regulation of OCS operations should be eliminated. The responsible government agencies should adopt an appropriate and effective mechanism of coordination and should clarify, in each instance of regulation, which agency has responsibility.

3. As the Subsection 21 (a) study progresses, the USGS and USCG should take appropriate actions, where indicated in the light of results produced by the study, to give effect to BAST in accordance with Subsection 21 (b).

4. In incorporating the BAST requirement of Subsection 21 (b) in OCS regulations, the USGS and USCG should begin immediately to introduce BAST into proposed new or revised regulations, orders, and applications for permits and approvals.

5. The USGS and USCG and the OCS lessees should give particular attention to the BAST requirement with respect to offshore sites of high potential risk and areas for which there is not a large body of operating experience, such as the North Atlantic and Arctic Oceans.

6. With respect to OCS operations in which deficiencies are known or have been suspected and opportunities for significantly improved performance have been identified, the USGS and USCG should initiate, promote, and, where necessary, invest in the development of improved technologies and in improved design review or quality assurance procedures. Government agencies should invest in technological development when there are inadequate incentives for industry to do so. This can occur when proposed technological developments are characterized by high risks or long-term payout periods, or both.

7. The USGS and USCG should prepare and follow a procedure for receiving and evaluating information from OCS lessees, operators, manufacturers, and the public about new technological developments or the need for new technologies in OCS operations.

8. The USGS and USCG should exercise leadership in developing appropriate performance standards for OCS operations by advocating or requiring procedures designed to assure careful consideration of BAST. While the agencies may be expected initially to rely on industry performance standards for OCS operations, particularly in areas of substantial operating experience, they should develop the technological capability to participate in the development and sponsorship of performance standards to complement and strengthen existing industry standards.

9. The USGS and USCG should determine the documentation on safety and environmental protection that is essential to the discharge of their statutory responsibilities. They should analyze the information obtained and develop procedures for making the information available to the public.

NOTES

1. Marine Board. A Suggested Strategy for Implementing the "Best Available and Safest Technologies" Requirement. Attachment to letter to Dr. Don E. Kash, U.S. Geological Survey. MB-78-449. Assembly of Engineering. National Research Council, Washington, D.C., December 12, 1978.

2. Federal Register, Vol. 44 No. 28, February 8, 1979.

3. OCSLA (P.L. 95-372), Sec. 21 (b).

4. House Report #95-590 (H.R. 1614) at 53.

5. Pub. L. 95-372, Sec. 102 (2) (B) and (3); 92 Stat. 631; 43 U.S.C. 1802.

6. Pub. L. 95-372, Sec. 101 (6), (8), and (9); 92 Stat. 630; 43 U.S.C. 1802.

7. Pub. L. 95-372, Sec. 208 (21) (a); 92 Stat. 654; 43 U.S.C. 1347.

8. Conference Report (Senate # 95-1091) at 108.

9. Pub. L. 95-372 was enacted on Sept. 18, 1978.

10. H. R. 1614, Sec. 21 (b), in House Report # 95-590 at 59.

11. House Report # 95-590 (H. R. 1614) at 156. The placement of (a) before (b) in Section 21 is suggestive but not determinative of the issue of chronological sequence.

12. House Report # 95-590 (H. R. 1614) at 54-55.

13. House Report # 95-590 (H. R. 1614) at 122.

14. Feb. 2, 1978, Cong. Rec. at H568.

15. Senate Report # 95-284 (S.9) at 79.

16. House hearing (H. R. 1614) at 1476-1477.

17. Conference Report (Senate #95-1091) at 109.

18. Senate Report # 95-284 (S.9) at 79.

19. House hearing (H. R. 1614) at 474-476.

20. House Report # 95-590 (H. R. 1614) at 159.

21. House Report # 95-590 (H. R. 1614) at 123.

22. Senate Report # 92-414 (S.2770-FWPCA) at 58.

23. H. R. 1614, August 29, 1977 (Report 95-590) at 193; S.9, July 15, 1977, at 63.

24. Feb. 2, 1978, Cong. Rec. at H570.

25. Conference Report (Senate #95-1091) at 29.

26. Conference Report (Senate # 95-1091) at 109; see also House Report # 95-590 (H. R. 1614) at 159.

27. Feb. 2, 1978, Cong. Rec. at H566-H568; House hearings (H. R. 1614) at 193.

28. Feb. 1, 1978, Cong. Rec. at H490; Conference Report (Senate # 95-1091) at 109.

29. House hearings at 474-476.

30. Pub. L. 95-372, Sec. 202 (Sec. 3(6); 92 Stat. 635.

31. House hearings (H. R. 1614) at 136; Senate hearings (S.9) at 5.

32. House Report # 95-590 (H. R. 1614) at 59.

33. S. 9, dated July 15, 1977, at 63.

34. Senate hearings (S.9) at 29.

35. House hearings (H. R. 1614) at 1159.

36. Senate hearings (S.9) at 112, 121-122.

37. Conference Report (Senate # 95-1091) at 109.

38. Rauch, Robert J. The Federal Water Pollution Control Act Amendments of 1972; Ambiguity as a Control Device, 10 Harv. J. Legis. 565, 583 (1973).

39. Pub. L. 95-474, Sec. 4417a. (1) (D); 92 Stat. 1480.

40. House Report # 95-590 (H. R. 1614) at 159.

41. Feb. 2, 1978, Cong. Rec. at H568.

42. Feb. 2, 1978, Cong. Rec. at H569.

43. Feb. 2, 1978, Cong. Rec. at H568.

44. See House hearings (H. R. 1614) at 423-424, 473.

45. Conference Report (Senate # 95-1091) at 109.

46. House hearings (H. R. 1614) at 933.

47. Senate Report # 95-284 (S.9) at 79.

48. Op. Cit. Notes 23, 24, 25.

49. U.S. Geological Survey. Policies, Practices, and Responsibilities for Safety and Environmental Protection in Oil and Gas Operations on the OCS. Department of the Interior, Washington, D.C., 1977.

50. Marine Board. Outer Continental Shelf Development Safety. Panel on Operational Safety. National Academy of Engineering, Washington, D.C., 1972.

51. Kash, Don E. and Irvin L. White, Energy Under the Oceans: A Technology Assessment of OCS Oil and Gas Operations. University of Oklahoma Press, Norman, OK, 1973.

52. President's Council on Environmental Quality, OCS Oil and Gas: An Environmental Assessment. Washington, D.C., 1974.

53. National Research Council. Report of the Review Committee on Safety of OCS Petroleum Operations. National Academy of Sciences, Washington, D.C., 1974, 1975.

54. Op. Cit. Note 49.

55. U.S. Geological Survey, Accidents Connected with Federal Oil and Gas Operations on the Outer Continental Shelf. Department of the Interior, Washington, D.C., 1978.

56. U.S. Geological Survey, Open File Report 78-092, 1978. See, for example. Research and Development Program for Outer Continental Shelf Oil and Gas Operations.

57. Office of Technology Assessment. Federal Role in OCS Oil and Gas Development: Agency by Agency Analysis. Congress of the United States, Washington, D.C., May 1977.

58. Op. Cit. Note 49.

59. For a Review of the state of the art in OCS technological development, see: Snyder, L. J. and J. M. McKinney, "Deepwater Drilling and Production Technology: a Presentation to the April 1978 Meeting of the OCS Advisory Board," Exxon Production Research Company, Houston, Texas, 1978.

60. See Notes 50 and 51.

61. Floyd Garrot, Exxon Corp. and member, Panel on Best Available and Safest Technologies. Working paper prepared for the panel. Marine Board, Assembly of Engineering. National Research Council. Washington, D.C. 1979.

62. National Oceanic and Atmospheric Administration. Preliminary Program Development Plan for Studies of Underwater Diving Techniques and Equipment. Department of Commerce, Washington, D.C., April 16, 1979.

63. U.S. Geological Survey. Oil Spills, 1971-1975, Gulf of Mexico Outer Continental Shelf. USGS Circular 741, Department of the Interior, Washington, D.C., 1976.

64. U.S. Geological Survey. Outer Continental Shelf Statistics. U.S. Department of the Interior. Washington, D.C. June 1979.

65. See, for example, Verification of Fixed Offshore Oil and Gas Platforms. National Research Council, Washington, D.C., 1977.

APPENDIX A

SUMMARY OF COMMENTS

INVITATION FOR PUBLIC COMMENTS
OIL AND GAS OPERATIONS ON THE OUTER
CONTINENTAL SHELF

FEDERAL REGISTER, VOL. 44, NO. 28, Thursday, February 8, 1979

Responses to the Advance Notice of proposed rulemaking that appeared in the Federal Register, Vol. 44, No. 28, February 8, 1979 (pp. 7980-1) can be roughly divided into three categories: industry, public interest groups, and government. Within the industry category, there are 12 oil and gas producing companies; 2 pipeline and drilling companies; 2 industry groups and 9 oil field equipment companies, including one oil field equipment group. One public interest group and one agency of the federal government responded to the notice, and two state governments and one county government group responded.* In addition to responding to the Advance Notice of Proposed Rulemaking, the county government also contracted for the development of a methodology to implement the BAST requirement. A draft of this methodology was submitted to the panel during the course of the study.

1. Industry Respondents

The comments of most industry respondents did not follow the sequence of the notice. Furthermore, seven of the nine oil field equipment companies did not comment on the notice, but instead brought their equipment to the attention of the USGS, and are therefore not included in this summary. One in this group commented on the notice, but only in relation to the company's equipment.

Industry comments focused on 6 specific issues: the requirements of Subsec. 21 (a) of the OCSLAA for a study of existing safety and health regulations and the technology, equipment, and techniques available for the

*Respondents are listed at the end of this summary.

exploration, development, and production of offshore oil and gas; the need for new and additional regulations; the definition of "best" and "safest"; the issue of technology forcing; considerations of economic feasibility; the implementation of performance requirements; and the application of BAST to existing facilities.

The two oil and gas industry groups, the American Petroleum Institute (API) and the Offshore Operators Committee (OOC), recommended completion of the study required by Subsection 21 (a) of the OCSLAA before implementing Subsection 21 (b), which requires the USGS to develop regulations for BAST. This recommendation is explicitly supported by nine of the oil and gas industries in their responses, and implicitly by three others who have indicated in their responses that they fully support the positions taken by the API and/or the OOC. Completion of the study described in Subsection 21 (a) will, claim these respondents, indicate the nature and extent of regulations to be implemented under Subsection 21 (b) and that the legislative concerns expressed in 21 (b) are being accomplished under existing regulations and operating practices.

Oil and gas producing industries comment that the USGS and the industry have been practicing BAST, that it is already a continuing process in OCS exploration and production, and that various rules in 30 CFR Part 250 appear to be "best available and safest." Further, they point out that existing USGS policies, programs, and procedures are adequate to assure requirements of Subsection 21 (b) without additional regulations. The USGS is cautioned that establishing more stringent regulations may not necessarily improve safety and health due to the overriding factor of human behavior. Industry respondents call attention to the difficulty of getting a consensus even within the industry on a definition of "best" and "safest;" further, they state that failsafe technology is unachievable in most instances, but that "adequately safe" technology is generally available. Industry questions the need for a "technology forcing" function, noting that it has a strong motivation for constantly upgrading its ability to protect the health and safety of its workers and the environment and for conserving natural resources.

Industry cautions government that the "economically feasible" standard must be related to specific circumstances of each OCS facility rather than applied on an industry-wide basis. Government was also cautioned to use discretion in applying BAST to existing facilities, as some of the older facilities are approaching depletion and their economic limit could result in premature abandonment of reserves.

Industry respondents agreed that "performance requirements" should based on demonstrated performance, noting that requirements for strict specifications inhibit technological development. However, where performance requirements are appropriate, only the item or type of equipment should be identified. Identification should not be limited to products of specific manufacturers. As one respondent pointed out, if specific items of equipment were identified as "best," lawsuits could be filed by manufacturers of competitive devices seeking injunctions against implementation of the law.

2. Public Interest

The public interest group joins industry in expressing concern that the study required under Subsec. 21 (a) of the OCSLAA has not commenced; however, in contrast to industry, they view the study as an assist rather than a prerequisite for meeting the requirements of Subsec. 21 (b). They urge the application of 21 (b) to include all pipelines over which the Secretary of the Department of Transportation has jurisdiction and are also in favor of the technology-forcing function. Further, they recommend that Sec. 102(2)C of the National Environmental Policy Act be used as a guide for determining whether a particular type of technology would significantly threaten the environment.

This group urges USGS to adopt very specific definitions and performance standards (justified by reference to technologies with which the standard can be achieved), and to press technology ahead, rather than be reactive to the industry. In order to do this, they suggest that the USGS should set up a special unit to undertake the necessary technical evaluations and set the standards.

3. Government Groups

The responding agency of the federal government suggested that equipment should be identified and standards established, especially with regard to subsea development technology for which there are now no relevant standards or regulations. One state government commends the USGS to a review of the concept of Best Available Control Technology (BACT) as used in the regulation of air emissions for relevance to Best Available and Safest Technology. They also endorse the concept of identifying technology that has failed. Another state government recommends that USGS seriously consider combining its rulemaking procedures, hearings, and studies with those of other federal agencies so that a consistent and definitive application of BAST may be arrived at. This state government agrees that requirements for BAST should be issued on a performance standard basis, and also feels that USGS procedures can be modified to accommodate BAST requirements. The state government notes, however, that implementing the BAST requirement would call for an expanded R&D capability within the USGS for the purpose of keeping up to date on technological developments and for assessing the economic, safety, and environmental benefits of these developments and developing performance standards.

The county government that responded to the comments in the Federal Register did so by suggesting that the USGS review an ongoing study that it is supporting of OCS orders, operating practices, and equipment against a criteria of BAST. This study is concerned with OCS drilling and production operations in the Baltimore Canyon. The county government accompanied its response to the USGS with proposals for continuing the study.

Respondents to the Department of Interior Notice in the Federal Register, February 8, 1979

1. Industry

A. Oil Companies

American Petroleum Institute--Roy F. Carlson, Production Director

Offshore Operators Committee--L. G. Otteman, Chairman, OOC

Western Oil & Gas Association--Tyler Brinker, Chairman, Drilling & Production Committee

CHEVRON, USA, Inc.--L. C. Soileau, III, Senior VP, Exploration, Land & Production

Continental Oil Co.--F. E. Ellis, Vice President, North American Production Department

EXXON Company, USA--H. B. Barton, Regulatory Affairs Manager, Production Department

GETTY Oil Company--Don F. Carlos, Vice President, Natural Resources Technical Services

GULF Oil Exploration and Production Co.--E. M. Miller, Vice President, Production, US

MOBIL Oil Corporation--G. R. Lucie-Smith, Vice President, Production

PENNZOIL Company--John W. Graves, Director, Environmental Safety & Health Affairs

SHELL Oil Company--G. C. Bankston, Vice President, Production

STANDARD Oil Company (Indiana)--D. E. Woodard, Manager, External Reports Coordination

TENNECO Oil Company--Dan B. Johnson, Senior Vice President

TEXACO--W. K. Tell, Jr., Senior Vice President

B. Associated Pipeline & Drilling Companies

Texas Eastern Transmission Corp.--J. C. Williams, Jr., General Manager, Compliance & Standards, Engineering Services Division

International Association of Drilling Contractors--unsigned

C. Oil Field Equipment

Petroleum Equipment Suppliers Association--W. J. Sallans, Executive Vice President

Flakt, Inc. (Ventilation & Air Conditioning Systems)--Anders Knoes

Greene's Pressure Testing & Rentals, Inc.--H. R. Greene, Jr., President

Johnston-Schlumberger, Inc. (Drill System Testing)--M. E. Gray, President

J. H. Menge & Co. (Ramp Walkways)--J. H. Menge, President

Offshore Emergency Systems, Inc. (Water Deluge Systems)--D. Freeze

Winel of America, Inc. (Outer Garments)--S. DeVries

Vetco Offshore Group (Heavy equipment)--F. Huntsinger, Sr., Founder and Chairman

2. Public Interest Groups

Natural Resources Defense Council, Inc.--Sarah Chasis, Senior Staff Attorney

3. Government

Environmental Protection Agency--W. N. Hedeman, Jr., Director, Office of Environmental Review

The Commonwealth of Massachusetts--John A. Bewick, Secretary of Environmental Affairs

Cape May County (N.J.) Planning Board--Elwood R. Jarmer, Director

State Lands Commission, State of California--William F. Northrup, Executive Officer

APPENDIX B

PARTICIPANTS AND OBSERVERS

MEETING OF THE

PANEL ON BEST AVAILABLE AND SAFEST TECHNOLOGIES

June 27, 1979
Board Room
NATIONAL ACADEMY OF SCIENCES
Washington, D.C.

ORGANIZATIONS:	REPRESENTED BY:
American Petroleum Institute Dallas, Texas	Roy. F. Carlson
Cape May (N.J.) Planning Board	*Robert Meyers Robert Mondor
Chevron U.S.A. Inc. San Francisco, California	**Claude Golay
Continental Oil Company Houston, Texas	A. A. Gentry
Flakt, Inc. Bellaire, Texas	Anders Knoes
Greene's Pressure Testing and Rentals Lafayette, Louisiana	*H. Rowe Greene, Jr. Richard Morrow Edward Hefferman
Gulf Oil Exploration & Production Co. Houston, Texas	Hubert Braunig
Massachusetts, the Commonwealth of; Secretary of Environmental Affairs	Lester Smith

* Principal

** Also representing Offshore Operators Committee

Mobil Oil Corporation New York, New York	James Helis
Natural Resources Defense Council, Inc. New York, New York	Sarah Chasis
Offshore Emergency Systems, Inc. Houston, Texas	*Don P. Freeze Bernard McCann Coots Matthews
Offshore Operators Committee New Orleans, Louisiana	*Claude Golay C. W. Mangus Dan Mendell III Jack Jones John Whitman
Petroleum Equipment Suppliers Association Houston, Texas	Phillip S. Sizer
Shell Oil Company Houston, Texas	O. J. Shirley
Tenneco Oil Company Houston, Texas	Robert W. Waldrup
Texaco Inc. Washington, D.C.	Robert Hunt

OBSERVERS

Keith Archer
Select Committee on the Outer Continental Shelf,
U.S. House of Representatives

Ernest B. Cohen
State of New Jersey, Department of Environmental Protection

Cdr. James C. Card
U.S. Coast Guard

Richard Krahl
U.S. Geological Survey

Ronald E. Prehoda
U.S. Geological Survey

T. Tackaberry
Select Committee on the Outer Continental Shelf,
U.S. House of Representatives

APPENDIX C

EPA's EXPERIENCE WITH "BEST" REQUIREMENTS

Introduction

The "best available and safest technology" (BAST) provision of the Outer Continental Shelf Lands Act Amendments of 1978 (Public Law 95-372) appears to follow precedents established by the Clean Air Act as amended (42USC187 et seq.) and Clean Water Act as amended (33USC1251). Germane provisions of both acts will be discussed in this section, as will the U.S. Environmental Protection Agency's (EPA) experiences in implementing these provisions. Finally, several important differences between the technologies, agencies, and acts will be discussed.

The Clean Air Act and Clean Water Act Requirements

The federal air quality regulatory system provides for both emission and ambient air quality standards. The former, which seems to be the more likely precedent for BAST, includes standards for both mobile and stationary sources. The Clean Air Act sets specific national mobile source emission standards for automobiles and what amounts to a "best practicable technology" for heavy duty vehicles. Current stationary source emission limits require that: (1) emissions from existing souces must be controlled to the extent necessary to maintain ambient air quality standards; (2) emissions from new sources shall be subject to new source performance standards (NSPS), which require the "best technological system of continuous emission reduction" which has been adequately demonstrated; "national emission standards for air pollutants" (NESAP), which provide an ample margin of safety to protect the public health; "prevention of significant deterioration" (PSD), which requires that new sources in pristine areas use "best available control technology" (BACT), and that emissions be within the allowable PSD increment; and, in non-attainment areas (areas which do not meet current ambient air quality standards), "lowest achievable emission rate (LAER)."

The Clean Water Act requirements apply to industrial, municipal, and non-point sources of water pollutants. Industrial requirements are: (1) use of "best practicable control technology" (BPT) currently available by existing sources by 1979; (2) "best conventional pollutant control technology" (BCPCT) by 1984; (3) "best available technology" (BAT) economically achievable by 1984 for toxic

substances and by 1984-1987 for non-conventional pollutants; (4) "new source performance standards" (NSPS) and "pretreatment" for all new plants; and (5) "pretreatment" for existing plants. Municipal requirements are: (1) secondary treatment by 1983 plus additional treatment if required to meet water quality standards; and (2) "best practicable waste treatment technology" (BPWTT) by 1983. Non-point sources are covered under the areawide planning provision in Section 208 and "best management practices" (BMP) are called for by Section 304.

In short, the Congress has legislated numerous air and water quality requirements which call for the use of "best" technologies. Modifiers such as available, practicable, and technologically achievable are added and usually are defined, at least implicitly, in demonstrated performance and economic terms. It is left to the Administrator of EPA to determine what constitutes "best practicable" or "best available." In doing so, he or she is to consider such factors as the total cost of the technology's application in relation to the benefits to be achieved, the age of the equipment and facilities involved, the process used, process changes, and the non-water consequences of applying the technology. It is also necessary that the technology must be demonstrated, either through demonstration projects, pilot plants, or by general use. Best available has been defined by EPA in relation to the best performer in any industrial category and best practicable in relation to the average of best performers.

Notes on EPA's Experience with the Requirements

The purpose of the Clean Water Act effluent limitations is to establish uniform national standards. However, discharge permits are issued on a plant-by-plant basis. Apparently, the difficulty of dealing with plant differences and uncertainty as to what constitutes the "best practicable control technology" (BPCT) led EPA to include a variance clause in its effluent limitation guidelines.

BPCT is expressed as a range based on the actual performance within a particular industrial category. However, EPA can also conclude that a higher level of control than the best technology currently in use is needed. As noted above, this higher level of control can be required only when the designated BPCT has been demonstrated in a demonstration project, a pilot plant, or by general usage.

EPA's first step in formulating effluent limitation guidelines was to employ contractors to gather information on the performance of control technologies in various industrial categories. These data provided the basis for the guidelines subsequently promulgated. But as noted above, EPA was still sufficiently uncertain as to what BPCT was that it added a variance clause which had the potential of producing a plant-by-plant standard at the time of permitting.

In the case of clean air, technologies for controlling sulfur dioxide emissions illustrate the difficulty EPA has had in establishing that a technology has been demonstrated to be the best practicable or best available control technology. The electric utility industry has vigorously disagreed with EPA concerning the status of flue gas desulfurization controls. In this case, since it was a technology not being used by the industry, EPA turned to its laboratories to establish that SO_2 scrubbers were a demonstrated best practicable control technology.

Findings

Although the Clean Air and Clean Water Acts apply to a broad range of technologies, their "best" technology provisions deal primarily with technologies to limit the discharge of air emissions and water effluents. BAST, on the other hand, seems to apply to all components for drilling for and producing oil and gas on the outer continental shelf. This difference is compounded offshore, since, over most of its history drilling and production systems have been treated as collections of components rather than as integrated systems. Apparently, no data base exists to support failure modes and effects or other similar analyses to help identify high risk components and to establish performance records.

While the Clean Air and Clean Water Act "best technology" standards apply to industry generally and must be implemented by the states, BAST applies only to one industry and its suppliers and in an area of exclusive federal jurisdiction.

In implementing the "best" technology provisions of the Clean Air and Clean Water Acts, EPA has had to contract extensively to obtain needed data upon which to base its regulations and definitions of what constitutes "best." And, particulary in the case of air pollutants such as SO_x and NO_x, it has needed the research, development and demonstration capability its labs provide.

At present, neither the USGS nor the Coast Guard appears to have the budget to obtain extensive contractor support or do in-house research which might be needed to support the implementation of BAST.

The Outer Continental Shelf Lands Act Amendments of 1978 would also seem to make implementation more difficult than do the Clean Air and Clean Water Acts by using the term "incremental" benefits and costs. The Clean Air and Clean Water Acts use more general language in stating an economic criterion to be employed by the Adminstrator of EPA.

A final point is that, under the Clean Air and Clean Water Acts, best practicable and best available control technologies are defined in terms of current industry performance data. It will be very difficult, if not impossible, not to rely on industry performance data as a basis for defining BAST. And, without either possessing an in-house research, development, and demonstration capability or having sufficient RD&D funds, it will be difficult for USGS and the Coast Guard to demonstrate that a technology not currently being used by industry is BAST.

APPENDIX D

Selected OCS Regulations which Address the Specific Purpose of BAST

Existing Programs

U.S. Geological Survey

1. OCS Order No. 2 requires that "The Operator shall utilize appropriate drilling technology and state-of-the-art methods, such as drilling rate evaluation, shale density analysis, or other appropriate methods, in order to enhance the evaluation of conditions of abnormal pressure, and to minimize the potential for the well to develop a flow or kick." The operator must submit engineering and geologic data used to substantiate conductor and surface casing setting depths with the application to drill. Pressure tests of the exposed formation must be taken during drilling to determine setting depth of intermediate casing strings. The Order contains detailed requirements relative to installation and testing of blowout prevention equipment and to monitoring of drilling mud. It requires that company and drilling-contractor supervisory personnel be trained in present-day well control techniques, and that blowout prevention drills be conducted weekly. The most recent version of Order 2 specifies H_2S drilling contingency plan and a drilling critical operations and curtailment plan.

2. OCS Order No. 5, covering subsurface safety devices, specifically addresses BAST by inclusion of the following section: "As technological research, progress, and product improvement result in increased effectiveness of existing safety devices or the development of new devices or systems, such devices or systems may be required or used upon application, justification, and approval." This Order requires installation of a surface-controlled subsurface safety device, the best technology currently available, as protection against blowout following well completion. It establishes a required test frequency for all subsurface safety devices, and requires that the operator maintain detailed records on design, installation, and failures of these devices. It also requires submittal of a failure analysis report on a quarterly basis.

3. OCS Order 7 requires that the operator maintain a USGS-approved oil spill contingency plan which must be reassessed annually. Standby pollution-control equipment must be available and must be inspected monthly to assure that it is in good condition.

4. OCS Order 8 requires that structures be designed in accordance with API RP 2A, a document that has been revised eight times due to changing technology and improved data since its original publication in 1969. Under a planned revision to Order 8, the operator will be required to comply with a new 48-page USGS document entitled "Requirements for Verifying the Structural Integrity of OCS Platforms." Order 8 specifies that platform safety and anti-pollution systems must be designed, analyzed, and installed in accordance with API RP 14C, a comprehensive safety analysis document which provides for two independent levels of protection to prevent or minimize the effects of an equipment failure within the process. Pressure vessels must be designed in accordance with applicable ASME codes, which undergo continuous updating. Electrical equipment must be installed in accordance with recognized codes and standards. Training is required for new employees, persons working with safety devices, and crane operators; and the operator must have an employee motivation program for safety and pollution prevention. An operator's contingency plan for conducting activities simultaneously with production operations and a welding and burning safe practices and procedures plan must be submitted to the USGS for review and approval.

U.S. Coast Guard

Regulations relevant to OCS activities are contained in Title 33 and 46 of the Code of Federal Regulations. They are listed here for identification, with a brief description of the contents.

a. Subchapter I - Cargo and Miscellaneous Vessels.
Title 46 CFR Part 90-105.

These regulations govern the design, construction, stability, and inspection of cargo and miscellaneous vessels. They also govern the lifesaving, firefighting, and vessel control equipment. In addition they establish special requirements for bulk cargo, nuclear, petroleum product, construction, and other special purpose vessels.

b. Subchapter IA - Requirements for Mobile Offshore Drilling Units.

These regulations govern the inspection and certification, the design and equipment, and the operation of mobile offshore drilling units. These regulations bring all MODU's under one set of uniform and comprehensive regulations. They are discussed in more detail in the next section.

c. Subchapter N - Artificial Islands and Fixed Structures on the Outer Continental Shelf. Title 33 CFR Part 140 - 146.

These regulations provide certain safety equipment and operating procedures for the safety of life and property on the artificial islands and fixed structures located on the Outer Continental Shelf.

d. Subchapter F - Marine Engineering Regulations. Title 46 CFR Parts 50 - 64.

These regulations govern the design, construction, installation, and inspection of boilers, pressure vessels, machinery and appurtenances (including castings, piping, valves, and mountings). These regulations apply to commercial vessels, including tank vessels.

e. Subchapter J Electrical Engineering Regulations. Title 46 CFR Parts 110 - 113.

These regulations govern the design, installation, and inspection of electrical systems, apparatus, and equipment installed on various types of vessels.

These regulations also implement various internal conventions for the safety of life at sea involving electrical equipment. Included in these regulations are rules for general electrical systems, emergency lighting and power systems, and communications and alarm systems.

f. Subchapter Q - Specifications. Title 46 CFR Parts 160 -164.

These regulations govern the design, construction, and inspection of items applicable to life-safety at sea. These specific design and performance requirements apply to lifesaving equipment, emergency lighting and signaling, safety valves, water tight doors, etc. Such items receive Coast Guard approval numbers and are listed in the Coast Guard Equipment List of approved items.

g. Subchapter E - Load Lines. Title 46 CFR Parts 42 - 46.

These regulations govern the establishment of load line marks on seagoing vessels. They establish the limits to which vessels may be safely loaded with respect to their structural strength and stability for the route intended. The rules, applied internationally, are a measure of seaworthiness.

New and Proposed Programs

U.S. Department of the Interior

1. Proposed Revised Gulf of Mexico Orders 6, 9, and 11

Proposed revisions to the Gulf of Mexico OCS Order 6 were published on June 11, 1976. The proposal includes new requirements for oil and gas well completion and workover procedures. Proposed revised Gulf of Mexico OCS Order 9 was published on June 4, 1974. It includes expanded requirements for the approval procedure for oil and gas pipelines. By notice of February 9, 1977, the USGS announced that it intended to revise certain provisions of Order 11 for the Gulf of Mexico and Pacific areas, including rate sensitivity, review of Maximum Efficient Rate (MER), reporting procedures, well testing, flaring and venting of gas, multiple and selective completions, and competitive reservoir operations.

2. Failure Information Reporting System (FIRS)

The Geological Survey Safety and Pollution Prevention Device Failure and Inventory Reporting System (FIRS) is applicable to offshore structures which produce or process hydrocarbons and includes the attendant portion of hydrocarbon pipelines when physically located on the structure for whatever purpose. The system is composed of two distinctively different yet interdependent programs. The Safety Device Inventory Reporting program is designed to provide information depicting the number of safety and pollution prevention devices by type, manufacturer, and model which are in service on the offshore platforms. The Safety Device Failure Reporting program is designed to provide information relative to failures of these devices by failure causes, corrective measures, device type, manufacturer, model, and frequency of failure. Failure percentages, reliability and quality trends, mean time between repairs, and mean time between failures, along with other useful statistical information, will be derived from these data. The program will be implemented through revision of OCS Order 5.

3. Drilling Training Standard

The purpose of this standard, which became an OCS requirement on January 1, 1978, is to provide for the qualifications of drilling personnel in well control equipment, operations, and techniques to ensure safety and to prevent pollution during drilling operations. It is applicable to the rotary helper, derrickman, driller, toolpusher, and the operator's representative. After December 1, 1979, only successful completion of a course of study at a USGS-approved

school shall be recognized as meeting the training requirements of the standard. The standard provides for refresher courses and retraining at regular intervals and requires that employee training records be maintained at the job site.

4. OCS Safety and Pollution-Prevention Standards Program

The Federal Register of January 3, 1978 announced that the USGS proposes to adopt certain generic standards and their attendant certification procedures as part of the Survey's program to enhance the quality and reliability of safety and pollution-prevention equipment used in oil and gas operations on the OCS. The standards and procedures were developed by the American National Standards Institute (ANSI) and the American Society of Mechanical Engineers (ASME). It is the intention of the Geological Survey to require, by OCS Order, that safety and pollution-prevention equipment comply with specific design-performance standards which incorporate, by reference, the provisions of the ANSI/ASME generic standards. It is expected in the near future that the "API Specification for Subsurface Safety Valves" (API Spec 14A) and the "API Specification for Wellhead Surface Safety Valves for Offshore Service" (API Spec 14D) will be accepted as meeting the criteria for specific equipment standards. After time is allowed for manufacturers or assemblers and test laboratories to obtain certification/accreditation, subsurface and surface safety valves manufactured or assembled and tested by certified and accredited firms will be required for use in production systems on OCS leases. Application of the program to other equipment will await development of the specific safety and pollution-prevention equipment standards.

5. Proposed Revision of OCS Orders 1-5, 7, 8, and 12

These order revisions appeared initially as proposed national OCS orders. As a result of the efforts of the USGS Conservation Division task force for reviewing the OCS Operations Safety Program, it was determined that the existing orders for individual areas of the OCS should be standardized. The task force concluded that the majority of the requirements of the existing OCS orders are common to all areas of the OCS and that only a minority of the requirements arise from environmental, geological, geophysical, or geographical differences between the various areas. The standardization of OCS orders was to be accomplished by the issuance of National OCS orders which contained the requirements that are common to all areas of the OCS and Appendices which contain specific local requirements for each area. Eventually, all OCS Orders were to be converted to national orders. It was subsequently decided not to issue national OCS orders; instead, the individual area orders are being revised and updated.

6. Platform Structural Verification Program

The program objective is to provide maximum assurance for the structural integrity of fixed and/or bottom founded oil and gas platforms on the OCS. The program has two major elements, one substantive and one procedural. The substantive element consists of a 48-page document entitled "Requirements for Verification of the Structural Integrity of OCS Platforms" (announced by Federal Register notice of December 5, 1978). The procedural element provides that all new platform designs and fabrications covered by the program must be reviewed and approved by qualified engineering and technical personnel to assure that the platforms meet the required performance requirements. The review of platform design and the monitoring of platform fabrication and installation would be carried out by the USGS or an independent third-party verification agent. Third-party personnel would be certified by the USGS as to technical qualification and lack of financial interest in the company or companies responsible for any aspect of the design, fabrication, or installation of the platform.

7. Proposed 30 CFR 250.34 - Exploration, Development and Production Plans

Proposed in the Federal Register of January 17, 1979, these regulations are intended to implement the provisions in the 1978 Amended OCS Lands Act which relate to (1) exploration activities on OCS oil and gas leases, (2) coordination and consultation with the Governors of affected states and the executives of affected local governments, and (3) development and production activities on OCS oil and gas leases. The regulations require the preparation of exploration plans and development and production plans, each with an accompanying environmental report. Approval of these plans, which contain a great deal of information specified in the regulations, is required before operations on the OCS can be commenced.

8. Proposed Development of Standards for Training and Qualification of Personnel Engaged in Oil and Gas Well Completion and Workover Operations on the OCS

This standard was proposed in a Federal Register notice of February 8, 1979. Its purpose is to ensure that personnel possess the required knowledge and skills in operations, equipment, techniques, and procedures to maintain the control of oil and gas wells during completion and workover operations or during any operation where a well which is capable of flowing oil or gas is opened to the atmosphere, its wellhead is removed, or the normal safety controls on the well are taken out of service. The USGS contemplates that the

developed standard will provide the minimum criteria for the training of all well completion and workover personnel whose decisions or actions have a significant bearing on safety or environmental protection. It is intended that the developed standard will be referenced as a requirement in the finalized OCS Order No. 6, which is now being developed for all OCS areas.

9. Proposed Revision of 30 CFR Part 250 - Oil and Gas and Sulphur Operations in the OCS

This proposal, published in 14 pages of the Federal Register of March 12, 1979, would extensively revise the complete set of regulations governing oil and gas and sulphur operations in the OCS to incorporate requirements of the 1978 Amendments to the OCS Lands Act. There are many significant changes proposed for Part 250 including (1) the substitution of a new "Remedies and Penalties" section to incorporate the civil penalties requirements of the Act and (2) revision of requirements dealing with suspension of operations and cancellation of leases, to incorporate the new lease suspension and cancellation provisions of the 1978 amendments. Many of the regulations in Part 250 were extensively rewritten for the stated purpose of making them more readable.

10. Proposed OCS Air Regulations

As announced in the Federal Register of May 10, 1979, requirements would be implemented through revision of 30 CFR Part 250. The regulations require that basic air emissions data be submitted by all lessees and, except where these activities are exempt, require that the impacts on onshore air quality of the emissions be determined through the use of air quality models. Criteria set forth in the regulations are to be used by the lessee to determine whether the impact from the emission will "significantly affect" onshore air quality. If significant effects occur, the provisions of the regulations requiring control of emissions will apply. Decisions concerning the potential impacts on onshore air quality of emissions and the necessity for control or offset of those emissions will be made as part of the approval process for exploration plans and development and production plans. State and local governments will have the opportunity to review and comment on the emissions data and proposed controls. In addition, states with approved coastal zone management programs will have this information available to make consistency determinations.

11. Intergovernmental Planning Programs for Leasing and Transportation of OCS Oil and Gas

The objective of this Bureau of Land Management program is to select the political, environmental, and economic optimum means of transporting OCS production. This includes pipeline and other alternatives. To achieve this goal, regional groups consisting of representatives from federal government, state and local governments, environmental organizations, and industry were set up under the charter of the OCS Advisory Board. The Advisory Board charter was revised in December, 1978 to initiate the program. The planning process will be conducted in several phases starting with the call for nomination of leases. It ends with development of a Regional Transportation Management plan developed from site-specific management studies

U.S. Department of Transportation

1. Requirements for Mobile Offshore Drilling Units

U.S. Coast Guard regulations, effective January 3, 1979, govern the inspection and certification, design and equipment, and the operation of mobile offshore drilling units. Mobile offshore drilling units had previously been subject to various regulations depending on whether they drill while bearing on the seabed. These regulations bring all mobile offshore drilling units under one set of uniform, comprehensive regulations and provide that all units be inspected and certified by the Coast Guard.

2. Commercial Diving Operations

New U.S. Coast Guard regulations governing commercial diving operations from vessels and OCS facilities including vessels required to have a Certificate of Inspection; deepwater ports; and artificial islands and other installations, became effective February 1, 1979. These regulations prescribe safety and health standards similar to the OSHA commercial diving standards.

3. Although details of proposed programs have not been announced, the U.S. Coast Guard is currently in the process of developing several regulations that will add new and additional requirements for OCS oil and gas operators. These include a general revision of 33 CFR Subchapter N which contains requirements relative to safety equipment and other matters relating to the promotion of safety of life and property on the artificial islands and fixed structures on the OCS; regulations pertaining to unregulated hazardous working conditions on the OCS; crane operator qualifications; and personal job safety standards for industrial vessels and fixed installations.

Environmental Protection Agency

1. Effluent Guidelines and Standards, Oil and Gas Extraction Point Source Category

Final effluent guidelines establishing "best practicable control technology currently available" (BPT) were promulgated effective April 13, 1979, for the offshore, onshore, coastal and agricultural and wildlife water use categories in the oil and gas extraction industry. These guidelines will be used as a basis for issuing EPA National Pollutant Discharge Elimination System (NPDES) permits for point source discharges from oil and gas operations on the OCS.